(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
15 March 2001 (15.03.2001)

PCT

(10) International Publication Number
WO 01/18665 A1

(51) International Patent Classification[7]: G06F 15/02, H04N 5/00, 7/14, 7/15

(21) International Application Number: PCT/US00/24819

(22) International Filing Date:
8 September 2000 (08.09.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/391,461 8 September 1999 (08.09.1999) US

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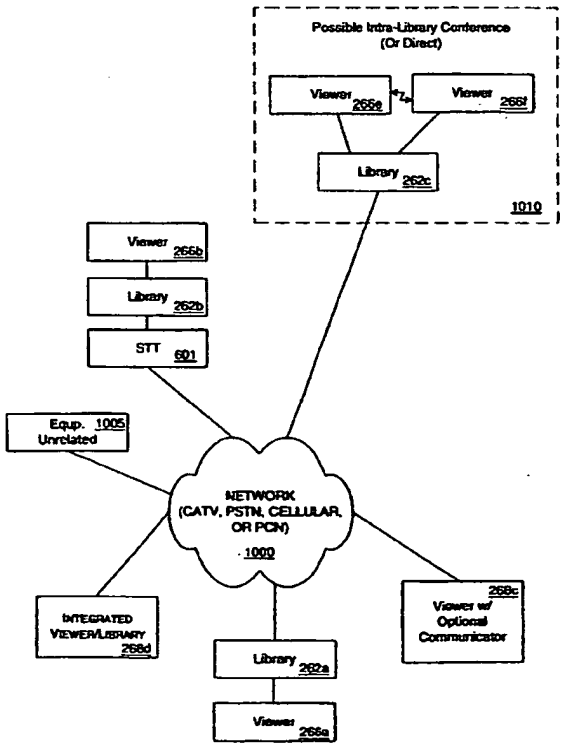
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(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian

[Continued on next page]

(54) Title: VIDEO CONFERENCING USING AN ELECTRONIC BOOK VIEWER



(57) Abstract: The present invention provides the capability to perform conference calls, preferably video conference calls, utilizing an enhanced electronic book viewer and/or electronic book delivery system. In one embodiment, the electronic book viewer comprises a memory, a video display, a speaker, a microphone, a transmitter, and a receiver. Data representing an electronic book can be stored in the memory and displayed on the video display. The transmitter is connected to the microphone, while the speaker is connected to the receiver. The transmitter and the receiver have sufficient bandwidth to accommodate a conference call. In another embodiment, the electronic book viewer comprises a memory, a video display, a speaker, a microphone, a transmitter, a receiver, a processor, and conference calling software. The processor is connected to the other components, and the conference calling software executes on the processor, enabling the electronic book viewer to be utilized in a conference call. Optionally, the conference call includes video received by the electronic book viewer and displayed on the video display.

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patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

VIDEO CONFERENCING USING AN ELECTRONIC BOOK VIEWER

Related Applications

This application is a continuation-in-part of the following commonly assigned, copending applications: (1) Application Serial No. 09/289,957, filed April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE DELIVERY SYSTEMS; (2) Application Serial No. 09/289,956, filed April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE DELIVERY METHODS; (3) Application Serial No. 09/335,268, filed June 17, 1999, entitled ELECTRONIC BOOK WITH INFORMATION MANIPULATION FEATURES; and (4) Application Serial No. 09/344,499, filed June 25, 1999, entitled ELECTRONIC BOOK WITH VOICE EMULATION FEATURES -- each of which is a continuation-in-part of, *inter alia*, Application Serial No. 08/336,247, filed November 7, 1994, entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, which is a continuation-in-part of (a) Application Serial No. 07/991,074, filed December 9, 1992, entitled TELEVISION PROGRAM PACKAGING AND DELIVERY SYSTEM WITH MENU DRIVEN SUBSCRIBER ACCESS and (b) Application Serial No. 08/160,194 filed December 2, 1993, entitled ADVANCED SET TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS. All of the above listed patent applications are hereby incorporated by reference.

Technical Field

The invention relates to electronic book viewers. More particularly, the invention relates to electronic book viewers with capabilities for conference calling and associated communication systems and processes.

Background OF The Invention

Sparked by the concept of an information superhighway, a revolution will take place in the distribution of books. Not since the introduction of Gutenberg's movable typeset printing has the world stood on the brink of such a revolution in the distribution of text material. The definition of the word "book" will change drastically in the near future. Due to reasons such as security, convenience, cost, and other technical problems, book and magazine publishers are currently only able to distribute their products in paper form. The electronic book system of the present invention solves the problems encountered by publishers.

Summary Of The Invention

The present invention is an improvement to electronic book delivery systems. More specifically, the present invention provides the capability to perform conference calls, preferably video conference calls, utilizing an enhanced electronic book viewer and/or electronic book delivery system.

The present invention provides an electronic book viewer that can be utilized in a conference call. In one embodiment, the electronic book viewer comprises a memory, a video display, a speaker, a microphone, a transmitter, and a receiver. Data representing an electronic book can be stored in the memory and displayed on the video display. The transmitter is connected to the microphone, while the speaker is connected to the receiver. The transmitter and the receiver have sufficient bandwidth to accommodate a conference call. In another embodiment, the electronic book viewer comprises a memory, a video display, a speaker, a microphone, a transmitter, a receiver, a processor, and conference calling software. The processor is connected to the other components, and the conference calling software executes on the processor, enabling the electronic book viewer to be utilized in a conference call. Optionally, the conference call includes video received by the electronic book viewer and displayed on the video display. As another option, the electronic book viewer further comprises a camera connected to the transmitter, and the conference call includes video transmitted from the electronic book viewer.

The present invention also provides a conferencing system comprising at least one electronic book viewer, at least one end equipment; and an interconnection network capable of linking two or more of the at least one electronic book viewer and the at least one end equipment in a conference call.

The present invention also provides a method of conferencing using an electronic book viewer. The method comprises displaying an electronic book on the electronic book viewer; participating in a conference call while viewing the electronic book; and communicating information content of the conference call with the electronic book viewer. Participation in the conference call may involve, for example, initiating or receiving a conference call.

The present invention also provides a method of distance learning using an electronic book viewer. The distance learning method comprises displaying learning material as an electronic book on the electronic book viewer; participating in a conference call while displaying the electronic

book; and communicating information content of the conference call with the electronic book viewer. For example, the learning material may include a textbook, and the conference call may be an interactive lecture concerning a subject of the textbook.

As used herein, the term "conference call," or sometimes more simply "call," denotes a traditional two-party call as well as a multi-party call or a single party call with storage and future access by others, includes calls utilizing only one or a combination of several types of media (e.g., voice only or voice plus video and/or other media such as data, programs, etc.), and includes one-way broadcast calls (i.e., view only) as well as full duplex calls or mixed media combinations of one-way broadcast and full duplex (e.g., broadcast video from one party and shared return audio from all parties).

Certain embodiments of the present invention achieve desirable advantages. Because an electronic book viewer is a daily use household appliance that has a high tech aura while being very practical, portable, and easy to use, it is highly advantageous to enhance the functionality of an electronic book viewer to support video conferencing. There are synergistic effects from the combined convenience of viewing electronic books in association with participation in a video conference call. For example, a conference call can be initiated while viewing an electronic book, which is a directory containing call connection numbers or addresses. As another example, a conference call can be initiated while viewing an electronic book, which may be a topic of the call or which can be transmitted wholly or partially as part of or in conjunction with the call. In yet another example, a user engaged in conference call that the user finds boring or distracting can conveniently view an electronic book while maintaining the conference call connection. Other advantages and benefits of the present invention will be apparent from the following Detailed Description of a Preferred Embodiment, with references to the Drawings.

Brief Description Of The Drawings

Figure 1 is a schematic showing an overview of the electronic book selection and delivery system.

Figure 2 is a block diagram of a hardware configuration for a four component home subsystem.

Figure 3 is a block diagram of a hardware configuration for a two unit home subsystem.

Figure 4 is a block diagram for an example of a library unit.

Figure 5 is a block diagram of an electronic book viewer.

Figure 6 is a block diagram of an electronic book viewer with video conferencing capabilities.

Figure 7 is a diagram of various video conferencing network connections according to a preferred embodiment of the present invention.

Figure 8 is a diagram of a mini-network without a central node, according to a preferred embodiment of the present invention.

Figure 9 is a diagram of a mini-network having a library central node, according to a preferred embodiment of the present invention.

Figure 10 is a connection diagram of a conference call among the three viewers.

Figure 11 is a block diagram of a video conferencing central node.

Detailed Description Of A Preferred Embodiment

I. Overview of An Electronic Book Delivery System

Electronic book selection and delivery systems distribute books to bookstores, public libraries, schools and consumers, providing a secure electronic system for both delivering selected books and receiving payments. The electronic book system of the present invention has an unusual combination of features that provides the consumer with a daily use household appliance that has a high tech aura while being very practical, portable, and easy to use.

An advantage of electronic books is the elimination of the distribution of any physical object such as a paper book or computer memory device from any book or text distribution system. The purchase of a book becomes a PAY-PER-READ™ event avoiding the overhead, "middle-men," printing costs, and time delay associated with the current book distribution system. Published material and text such as the President's speech, a new law, a court decision on abortion, or O.J. Simpson's testimony can be made immediately available to the consumer at a nominal fee.

The primary components of an electronic book delivery system are the subsystem for preparing the text for delivery and the subsystem for receiving and selecting text that was delivered. The system may be configured for use by bookstores, public libraries, schools and consumers. The system for consumer use is made up of four subsystems, namely: (1) an operations center, (2) a

distribution system, (3) a home subsystem including reception, selection, viewing, transacting and transmission capabilities, and (4) a billing and collection system.

The operations center performs several primary functions: manipulating text data (including receiving, formatting and storing of text data), security encoding of text, cataloging of books, providing a messaging center capability, and performing uplink functions. In one embodiment, the system delivers the text from the operations center to consumer homes by inserting text data within analog video signals. The insertion of text is generally performed with an encoder at an uplink site that is within or near the operations center. The system can use several lines of the vertical blanking interval (VBI), all the lines of the analog video signal, a digital video signal or unused portions of bandwidth to transmit text data. Using the VBI delivery method, the top ten or twenty book titles may be transmitted with video during normal programming utilizing existing cable or broadcast transmission capability without disruption to the subscriber's video reception. Using the entire video signal, thousands of books may be transmitted within just one hour of air time. Nearly any analog or digital video or data distribution system may be used to deliver the text data. The Application Serial No. 09/289,956, cited above, provides additional details of distribution systems.

The home subsystem performs at least four functions: connecting to the distribution system, selecting text, storing text, and transacting through a communicating mechanism. The components of the home subsystem may be configured in a variety of hardware configurations. Each function may be performed by a separate component, the components may be integrated, or the capability of existing cable set top converter boxes, computers, and televisions may be utilized. A connector, library unit and viewer unit may be used. In one embodiment, the connector portion of the home subsystem receives an analog video signal and strips or extracts the text from the video. The home library stores the text signal, provides a user friendly software interface to the system and processes the transactions at the consumer home. The viewer provides a screen for viewing text or menus and novel user friendly controls.

The viewing device may be a portable book shaped viewer which stores one or more books for viewing and provides a screen for interacting with the home library unit. In one embodiment, a high resolution LCD (liquid crystal display) is used to both read the books and to interact with the home library software. In one embodiment, an optional phone connector or return-path cable connection initiates the telephone calls and, with the aid of the library, transmits the

necessary data to complete the ordering and billing portion of the consumer transaction. The billing and collection system performs transaction management, authorizations, collections and publisher payments automatically.

Figure 1 shows one embodiment of an electronic book selection and delivery system 200. The delivery system 200 includes: an operations center 250 including an uplink site 254; a video distribution system 208; an electronic book device, or home system 258 including a video connector 212, a library 262, a viewer 266, and a phone connector 270; telephone system 274; an Internet web site 279; and a billing and collection system 278. Also as shown in Figure 1, the home system 258 may include connections to a television 259, a printer 318 and a personal computer 261 may be used to display menu screens, electronic books, electronic files, or any other information associated with the electronic book delivery system 200. In addition, the television 259 and the personal computer 261 may provide control functions that replicate and supplement those of the viewer 266.

The operations center 250 receives textual material from outside sources 282 such as publishers, newspapers, and on-line services. Alternately, the outside sources may maintain electronic books at the Internet web site 279. The outside sources 282 may convert textual and graphical material to digital format, or may contract with another vendor to provide this service. The operations center 250 may receive the textual and graphical material in various digital formats and may convert the textual material to a standard compressed format for storage. In so doing, the operations center 250 may create a pool of textual material that is available to be delivered to the home system 258. The textual material may be grouped by books or titles for easy access.

As used herein, "book" means textual or graphical information such as contained in any novels, encyclopedias, articles, magazines, newspapers, catalogues, periodicals, or manuals. The term "title" may represent the actual title assigned by an author to a book, or any other designation indicating a particular group, portion, or category of textual information. The title may refer to a series of related textual information, a grouping of textual information, or a portion of textual data. For example, "Latest Harlequin Romance", "Four Child Reading Books (Ages 10-12)," "Encyclopedia 'BRITANNICA'™," "President's Speech," "Instruction Manual," "Schedule of 4th of July Events," "Pet Handbooks," "Roe v. Wade," and "The Joy of Cooking," are suitable titles. Also, the title may be a graphical symbol or icon. Thus, a picture of a wrench may be a title for a

repair book, a picture of a computer a title for a computer book, a graphical symbol of a telephone a title for a telephone book, a drawing of a dagger a title for a mystery book, a picture of a bat and ball a title for a sports book, and a picture of tickertape a title for a business book.

The operations center 250 includes the uplink site 254 for placing the text onto a telecommunications signal and sending the telecommunications signal into a distribution system. The uplink site 254 would generally include an encoder(not shown in Figure 1) to encode the text onto the telecommunications signal.

Many analog and digital video distribution systems may be used with the electronic book delivery system 200, such as cable television distribution systems, broadcast television distribution systems, video distributed over telephone systems, direct satellite broadcast distribution systems, and other wired and wireless video distribution systems. Nearly any distribution system which can deliver a telecommunications signal, including a video signal, will work with the electronic book delivery system 200. It is also possible to distribute the electronic book without using a telecommunications signal as described in detail in U.S. Application Serial No. 09/289,956, already cited above.

The home system 258 performs five functions related to the reception and viewing of electronic books: (1) connecting with a video distribution system; (2) selecting data; (3) storing data; (4) displaying data; and (5) handling transactions. An important optional function of the home system 258 is communicating using, in one embodiment, a telephone communication system 274. The home system 258 may be made up of four parts: a video connector 212 or similar type of connector for connecting with the distribution system 208, a library 262 for storing and processing, a viewer 266 for viewing menus and text and a telephone connector 270 for connecting with a telephone communications system 274.

The billing and collection system 278 may be co-located with the operations center 250 or located remote from the operations center 250. The billing and collection system 278 may be in communication with the home system 258 using telephone-type communication systems (for example 274). Any of a number of communication systems, as presented in the application serial no. 09/289,956, such as a cellular system or the Internet, will operate with the billing and collection system 278. The billing and collection system 278 records the electronic books or portions of text that are selected or ordered by the subscriber. The collection system can charge a subscriber's

credit account or bill the subscriber. In addition, the billing and collection system 278 may monitor the amount due to publishers or other outside sources 282 who have provided textual data or other services such as air time to enable the text delivery system 200 to operate.

Also within the scope of the present invention is an intranet configuration of the embodiments illustrated in Figure 1 that may be used as a part of a private distribution network for distributing and circulating electronic books. For example, a university library or bookstore may use such an intranet to circulate electronic books to university students and professors.

Additional details regarding the electronic book selection and delivery system 200 as well as alternatives can be found in the copending U.S. Application Serial Nos. 09/289,956 and 08/336,247, already cited above.

II. Electronic Book Home System

The hardware configuration for a four component home system 258 is shown in Figure 2. Figure 3 shows a hardware configuration for a two component home subsystem. The home system 258 performs several functions, such as receiving data and video transmissions, stripping (or extracting) the data from the video signal, screening and storing the data, providing user friendly interface controls and software, displaying menus and text, processing transactions, initiating telephone calls and transmitting billing data. Various hardware configurations may be utilized to achieve the desired functions of the home system 258. For example, as shown in Figure 3, the home system 258 can be configured to utilize the reception and channel tuning capability of the current installed subscriber base of cable converter boxes and televisions 601 and networked computers. The home system 258 can also be designed as an advanced set top terminal with menu generation capability, electronic memory and a telephone modem.

The electronic components that make up the home system 258 can be arranged in a variety of ways. In the four unit subsystem of Figure 2 the viewer 266 and library 262 are wired together while the remaining components communicate through RF (radio frequency) transceivers 604. In a simple version of the home system 258 there are only two units, a library 262 and a viewer 266. Figure 3 shows a two unit home system 258 with certain optional features.

The viewer 266 is generally equipped with a high resolution viewing area 602, digital logic (including a key 605, security 606, and a microprocessor 621), video graphics control and memory 607, power supply circuitry (not shown in Figure 3), an optional battery 603 and an optional RF

transceiver 604. In a two unit arrangement, the library 262 contains the connector function to the electronic book distribution system, connector function to a public telephone communications system, and memory 600, which may be removable and portable memory 600' (Figure 4). More specifically, the library 262 would include data stripping functions 617, digital logic 609, memory storage 600, power circuitry 610, optional connections 611, including cellular or PCN (personal communications network) phone 611', optional battery (not shown), optional tuner module 613 and an optional RF transceiver 604. The connector 212 and the public telephone system connection 270, as well as the removable portable memory unit 600' of the library 262 may be broken out into separate components. (Figure 3 shows a removable portable hard disk memory 600' with removable cartridges 614.) Finally, the home system 258 may include an attached keyboard 267 or a wireless keyboard 268. Both the attached keyboard 267 and the wireless keyboard 268 may be used to communicate with the viewer 266 (not shown) or the library unit 262. The wireless keyboard 268 may communicate using RF signaling, for example.

In an alternate arrangement, all functions of the home system 258 may be incorporated into a single unit. The functions of the library 262, for example, may be carried out by a card or chipset in the viewer 266. All the communications devices needed to couple the home system 258 to various telecommunications networks may also be incorporated into the viewer. All interfaces between the home system 258 and the subscriber may be included with the viewer 266. In this embodiment, the viewer 266 may include a communication device for receiving inputs from a separate keyboard.

Therefore, the home system 258 may have as many as five separate components, which communicate with each other. The two, three, four or five separate components which make up the home subsystem can communicate with each other in a variety of ways, including hardwired connection 615, RF transceiver 604 and other wireless methods.

RF communications may be used in the home, allowing separate components to be located throughout the home without restriction. The data communicated between the units may be secure data. In addition, the library 262 may provide power to the viewer 266 through the hard wire communication link 615.

To receive and strip data from a video signal at the consumer's home, a device such as a cable interface device or cable connector 212, 21' is used. The cable connector device 212'

includes a tuner 613, while the cable interface device 212 makes use of existing tuning equipment in the home. In either configuration, data is stripped from the video signal and stored at the subscribers location in the library 262. The phone connector 270, optional connector 611, and a modular connector initiate communications and transmit ordering and billing information to the operations center 250 or billing and collection system 278. A digital connector 619 is provided to communicate digital information with the set top terminal 601. The library 262 is the intelligent component of the home subsystem, incorporating the hardware and software necessary to store the text data, generate menus and effect the purchase transactions. In addition to an RF transceiver 604, the home library 262 also includes the necessary jacks and connections (e.g., communications connector 270') to allow the system to be connected to the viewer 266. As shown in Figure 3, the library 262 communicates the text data to the viewer 266 in a secure format, which requires a key 605 for decryption. The text may be decrypted page by page just before viewing.

A. Video Connector

The connection to the video distribution system may be a cable connector to a cable television delivery system, as shown in Figure 3. The cable connector includes a data stripper circuit 617, which accepts video input from either a set top terminal 601, a TV or a VCR, or an optional tuner block 613 that receives the CATV signal through the cable connector 212'. The data stripper circuit 617 strips data out of the video, and outputs a digital bit stream to the digital logic portion 609 of the library unit 262. The data is embedded in the video signal either in the vertical blanking interval or the active video portion in an encrypted and compressed format. The data stripper circuit 617 can be placed inside the set top terminal 601, TV, or in the library unit. The data stripper circuit 617 outputs the digital bit stream to be used by the library digital logic 609.

The video connector 212 may also contain a channel tuner module 613 that can tune to the video channel and provide access to the video that contains the data to be stripped. Using the optional tuner module 613, a set top terminal, VCR, or TV tuner is not needed in the home subsystem. The optional tuner module 613 would instead receive the CATV signal directly through the cable connector 212'. Additional connector options, which allow for the receipt of electronic book content using alternative delivery methods, are possible. This ubiquitous access is provided using the modular connector as depicted in Figure 3.

B. Library

An embodiment of the library 262 for a two unit home subsystem is shown in both Figure 3 and Figure 4. The embodiment shown includes the following optional parts: the video connector 212, phone connector 270, RF transceiver 604, and battery pack 624 in addition to a removal portable memory 600', microprocessor 628, instruction memory unit 632, digital logic 636, and power unit 640.

The library 262 contains a digital logic section 609 (not shown in Figure 4) which includes the microprocessor 628, the digital logic 636 and the instruction memory unit 632. The microprocessor 628 may be a secure microprocessor such as the Mot SC21 device sold by Motorola. The digital logic section 609 receives the serial digital bit stream from the data stripper circuit 617 and process the data. Error correction is also performed by the digital logic section 609 and the data is checked for a proper address. If the address of the data is correct and the library 262 is authorized to receive the data, the data is transferred to the memory storage unit 600, 600'. Authorization to receive the data is provided by the cable headend or another distribution point. An authorization code may be sent in the serial digital bit stream. The digital logic section 609 sends appropriate text and graphical data to the memory storage unit 600, 600'. It transfers this data in a compressed and encrypted format and the data remains stored in a compressed and encrypted format.

1. Memory Storage Unit

The memory storage unit of the library may be a removable portable memory unit 600' (as shown in Figures 2-4). A variety of options are available for memory storage: a hard disk drive, such as one having an 80 megabyte or 200 megabyte capacity; a hard disk with removable platters; and a CD ROM. Referring to Figure 3, a hard disk drive unit 600', which contains removable platters, may also be used. This would provide virtually unlimited library storage capacity. Data will be stored in the memory storage unit in a compressed and encrypted format. As is also shown in Figure 3, the data may also contain a key or unique ID number that matches the ID or key of the viewer 266. This matching of a unique key or ID number prevents unauthorized transfer of text data from the memory storage unit to an unauthorized viewer. Small memory devices such as smart cards, electronic memory cards or PCM CIA cards (personal computer memory card industry association) may also be used to store the data.

2. Power Circuitry

As shown in Figures 3 and 4, the library 262 will accept power from AC wall power 610, DC power 640, or optional battery power 624. The power circuitry 610, 640 may provide all the voltage necessary from either the battery 624 or AC unit for the various circuitry in the library. The power circuitry 610, 640 may also provide power to the viewer through a single data cable when connected to the viewer. The power circuitry 610, 640 will recharge the battery using AC power when in operation. With the optional battery unit 624 installed, the library 262 becomes a portable unit and can still provide power to the viewer 266. In order to extend battery life, power conservation measures may be utilized, such as shutting down the memory system when not in use. When the viewer unit 266 is being utilized and the library circuitry is not being utilized, virtually all power may be shut down to the library 262.

3. Connection to the Public Telephone System

In an embodiment, the connection to the telephone system may be provided by a connector device 611, which consists of a modem. Various available modems may be used to perform this function. As shown in Figure 3, cellular phone or PCN phone connections 611' may also be provided. When the home system 258 is first initialized, the modem may be used to transfer the name and credit card information of the consumer to the billing and collection system 278. The telephone connection 270 may be utilized each time an electronic book is purchased by a consumer to complete and record the transaction. The telephone connection 270 may also be used to receive the text data from the operations center 250, by-passing the video distribution system 208. Additionally, the telephone connection 270 may be used to send and/or receive video and/or audio associated with a conference call. The telephone connection 270 may be a separate unit as shown in Figure 3. However, alternate means exist to connect the home system 258 to the billing and collection system 278 or the operation center 250. The modular connector (shown in Figures 3 and 4) provides access to each communication network to provide a path from the home system 258 to the billing and collection system 278 or the operations center 250.

Additional details regarding the home system 258 as well as alternatives can be found in the copending U.S. Application Serial Nos. 09/289,956 and 08/336,247, cited above.

III. Electronic Book Viewer

Figure 5 is a block diagram of a viewer 266 showing its internal components. The viewer 266 of Figure 5 is similar to the viewer 266 depicted in Figure 3. The viewer 266 is preferably designed to physically resemble a bound book. The viewer 266 is made up of five primary components and several optional components: (1) LCD display 602; (2) digital circuitry (not shown); (3) video graphics controller 607'; (4) input controls 740'; (5) book memory 728; (6) optional power supply circuitry 736; (7) optional battery 603'; (8) optional RF transceiver 604; and (9) optional alternative communication interface devices, such as cellular or mobile connector 611; (10) optional keyboards 267 and 268 (not shown); and (11) an optional speaker/microphone 608'.

(1) A high resolution LCD screen 602, of VGA quality, may be used by the viewer 266 to display text and graphic images. Alternatively, flat panel CRT technology can be employed for the screen 602. The screen 602 may be the size of one page of an electronic book. A two page screen or two screens may also be used with the viewer 266.

(2) Digital circuitry that includes a secure microprocessor 621, instruction memory 732, and digital logic. Data is transferred to the viewer 266 in compressed and encrypted format. The secure microprocessor 621 compares the ID number of the viewer 266 with the incoming data stream and only stores the text data if the ID number of the viewer 266 matches that within the incoming data stream. The viewer 266 may be configured not to output text data or other data, and the data can be decompressed and decrypted only at the moment of viewing and only for the current page being viewed. These measures provide additional security against unauthorized access to data.

(3) A video graphics controller 607' that is capable of assisting and displaying VGA quality text and graphic images is included in the viewer 266. The graphics controller 607' is controlled by the digital circuitry described above. Text may be displayed in multiple font sizes.

(4) The viewer 266 of Figure 5 has touch panel controls. These unique and novel controls allow the consumer to select stored electronic books and electronic books from catalogues, move a cursor, and turn pages in an electronic book. Typically, the controls include forward and reverse page buttons, a ball for cursor movement, one or more selection buttons, a current book button and a bookmark button.

(5) Book memory 728 for at least one electronic book or other data is included in the viewer 266. The memory 728 stores text and any graphics, which represent pictures in a book. The memory 728 can also store menu graphics data. Two different memory 728 devices may be used in the viewer 266, one for the instructions for the microprocessor 621 in the digital circuitry and a second type of memory may be used for the book memory 728 (and graphics). Various memory devices available on the market may be used such as, ROM, RAM or a small hard disk. Since an electronic book requires approximately 0.6 megabytes of storage, a small hard disk providing approximately 60 MBytes of storage provides memory to store approximately 100 electronic books.

Text for electronic books may be displayed in various font sizes. To accommodate various fonts for display, a variety of fonts are stored in instruction 732 or book memory 728. Thus larger or smaller fonts may be recalled from memory 621, 728 to create displays desired by the subscriber.

(6) Power supply circuitry 736 in the viewer 266 accepts power from either an AC power source or from an optional battery 603' or the library 262. The power supply circuitry 736 provides the necessary voltages to accommodate the various systems within the viewer 266.

(7) An optional battery 603' is provided in one embodiment. The battery 603' is automatically recharged when AC power is available.

(8) An optional RF transceiver 604 which provides a two-way data link between the viewer 266 and other components of the home subsystem can also be included in the viewer 266.

(9) The optional alternative communication interface devices allow the viewer 266 to make use of a variety of communication paths. For instance, the viewer 266 may include a cellular or PCN transceiver 611 for mobile communications.

(10) The optional wired (attached) keyboard 267 and wireless (e.g., RF) keyboard 268 (see Figure 2) may be used with the viewer 266 to provide communications between the subscriber and the viewer 266.

(11) The optional speaker and microphone 608' allow the viewer 266 to provide audio signals to the subscriber, and allow the subscriber to provide an audio input. The speaker and microphone 608' may be used in conjunction with the cellular transceiver 608 or other

telecommunications equipment to provide for reception and transmission of telephony and data.

The viewer 266 of Figure 5 has parts available for providing connections to: a library 744, electronic card memory 748, CD ROM units 752, and a portable memory unit 756 (such as that shown in Figure 3 as 600'). Various electronic memory cards such as PCMCIA can be used with the viewer 266 to supply and store electronic books.

Security, low power consumption and excellent display technology are desired features of the viewer 266 design. The viewer 266 should be lightweight and portable. The viewer 266 contains a software operating system that allows electronic books to be stored, read and erased and includes the capability to order electronic books and retain them in memory 728 for a predefined period of time determined by the system operator. The software can be configured to allow the electronic book to be read during a period of time (i.e., two weeks) and then automatically erased, read once and erased, or held in memory permanently. Each viewer 266 may have a unique key 605. All of the data storage may be encrypted with the key 605 for an individual viewer 266 to prevent more than one viewer 266 accessing the text file or electronic book file.

To support video conferencing, the viewer 266 can be augmented with additional features, as shown in Figure 5. The additional features can be integrated into an enhanced electronic book viewer 266 or provided as one or more upgrades to a more basic electronic book viewer 266. In Figure 5, a camera 608" and an input device 740' are included in the viewer 266. The camera 608" is preferably a small video camera located and oriented on the viewer 266 so that it is typically directed at the face, torso, or entire body of one viewing the display 602. The direction of pointing is manually adjustable by the user. Alternatively or additionally, the camera 608" can be electronically steerable, focusable and otherwise controllable.

The input device 740' may take many forms. The input device 740' performs the function of accepting user input in order to establish and manage a conference call, e.g., entering party identifiers, hanging up, etc. Exemplary forms of the input device 740' include a telephone style number key pad; cursor/pointer movement device, such as a track ball, joystick or touch pad; click-type buttons; and a wired or wireless interface to a separate keyboard. Alternatively or additionally, the display 602 and the input device 740' can be combined in the form of a

touchscreen. The input device 740' may be a combinations of several different forms, including the illustrative ones just mentioned.

Conference calling also requires an upstream (or reverse path or transmission) communication capability of sufficient bandwidth. The upstream communication capability for video conferencing is in addition to the downstream communication capability by which textual book data can be received, and the upstream communication capability requires significantly more bandwidth than that minimally required for ordering or billing related to electronic books.

To support conference calling, the instruction memory 732 of the viewer 266 preferably contains programs for call establishment and management. The programs provide menus and a graphical user interface for call initiation, adding a party to a call, accepting an incoming call, terminating a call, and setting up call characteristics as well as display and other output characteristics.

Figure 6 is a block diagram of videoconferencing transmission and reception functions of the electronic book viewer 266. In regards to transmission, a video signal from the camera 608" is subjected to source encoding (i.e., conversion to spectrally efficient or compressed digital form) by a video source encoder 705, and an audio signal from the speaker/microphone 608' is subjected to source encoding by an audio source encoder 710. The source encoded video and audio signals are synchronized and multiplexed together by a synchronizer multiplexer 715. The video source encoder 705, audio source encoder 710 and the synchronizer multiplexer 715 together can function to perform standard audio/visual encoding algorithms such as MPEG (motion picture expert group) or ITU standard H.261 or H.263, which are well known in the art. Other media signals or signals containing signaling information can also be multiplexed with the audio and video signals, as described in greater detail below. The multiplexed audio/visual signal output from the synchronizer multiplexer 715 is optionally encrypted by an encryptor 720 and channel encoded (e.g., forward error correction encoding and /or interleaving) by a channel encoder 725 before being transmitted by a transmitter 730 upstream into a video conferencing connection network. Those skilled in the art will appreciate that the transmission functions illustrated in Figure 6 can be implemented in an order different from that illustrated.

In regards to reception, an incoming (i.e., downstream) video conferencing signal is received by a receiver 750, decoded by a channel decoder 755, decrypted by a decryptor 760,

and demutliplexed with proper relative timing among video, audio and other data components by a demultiplexer synchronizer 765. Video signals are decompressed and output for display by a video source decoder 770. Audio signals are decompressed and output for playing by an audio source decoder 775. Again, the order of processing can be different from that illustrated.

The other signals that can be multiplexed with the audio and video conference call signals include, for example, data files, electronic books, or HTML (hyper-text markup language) based content according to the ATVEF (advanced television enhancement forum) specification. The HTML content may be displayed on the viewer 266, may be stored in the home system for later use, or may be passed to devices such as televisions or computers attached to the home system components for immediate or later display. Broadcast data triggers, announcements, and content resources can be sent in the VBI of the video conference video signal on in an auxiliary data channel delivered with the video conference signal. Announcements are used to indicate to the viewer 266 that interactive programming content is available for a given video conference or segment of a video conference. Content resources contain the actual content or programming to be run on the receiving device. Such content includes Web pages, scripts and images. The broadcast data trigger is used to synchronize the initiation of the interactive programming content to the ongoing video conference.

IV. Network for Video Conferencing

Figure 7 illustrates a video conferencing network 1000 and various configurations for connecting viewers 266 (or other video conferencing end equipment 1005) to the network 1000. The network 1000 provides full duplex interconnectivity between viewers 266 involved in a given video conference call. The network 1000 can support many simultaneous calls. One typical configuration for connecting a viewer to the network 1000 is via a library, such as shown in the lower central area of Figure 7, where a viewer 266a is connected to a library 262a, which in turn is connected to the network 1000. A variation of this configuration is shown in the upper left area of Figure 7, where a set top terminal 601 is an intermediary between the network 1000 and a library 262b linked to a viewer 266b. Another typical connection configuration is a direct connection between the network 1000 and a viewer 266, such as the viewer 266c provided with an optional communicator, or the viewer 266d, which is provided with integrated library functionality.

A. Mini-Networks

Figure 7 also illustrates a mini-network 1010. The mini-network 1010 can provide full duplex interconnectivity between viewers 266 in a limited area (e.g., within a home, building, or campus) so as to support video conference calls without involvement of the network 1000. For example, in the case of a video conference call between two viewers 266e and 266f within the mini-network 1010, the connection between the viewers 266e and 266f can be a direct connection or it can be a connection through the library unit 262c. Figures 8 and 9 further illustrate these two connection options, respectively.

1. Direct Links Between Viewers

In Figure 8, the viewers 266e and 266f, as well as a third viewer 266g, communicate with each other without an intermediary. The communication paths between the viewers 266e-266g are preferably wireless links, and in one embodiment the wireless links are RF links that utilize the RF transceiver 604 in each of the viewers 266e-266g. Wireless infrared links are also possible. In alternate embodiments, the communication paths can be provided by wired networks, such as an existing data or computer network (e.g., LAN), existing television cabling, or existing home/building power wiring (as disclosed, for example, in U.S. Patent No. 5,319,634, which is hereby incorporated by reference). In any case, the channel linking the viewers 266e-266g is multiplexed to accommodate six unidirectional links that connect the three viewers 266e-266g in a fully meshed network. Although one skilled in the art will readily appreciate that many multiplexing schemes are possible, including TDMA (time division multiple access) and FDMA (frequency division multiple access), the multiplexing scheme preferably utilizes CDMA (code division multiple access), also termed SSMA (spread spectrum multiple access), techniques. Advantages of CDMA in this instance include security of transmissions and the fact that FCC (Federal Communication Commission) regulations might not apply to these transmissions.

In one embodiment, an asynchronous direct sequence CDMA system with a common spreading code is utilized. Similar CDMA systems are well known and discussed, for example, in U.S. Patent No. 5,103,459 and U.S. Patent No. 5,546,381, both of which are hereby incorporated by reference. In such a system, the transceiver 604 of each of the viewers 266e-266g includes an omnidirectional or essentially omnidirectional antenna, so that each viewer 266e-266f can receive the transmission of the other two viewers. Each of the viewers 266e-266g encodes its

transmissions using the same m-sequence as a direct sequence spreading code but at different phases. For example, the viewer 266e may transmit at a relative code phase of zero; the viewer 266f may transmit at a relative code phase of -3.2 chips; and the viewer 266g may transmit at a relative code phase of +38.0 chips. Actually, each of the viewers 266e-266g can transmit at a random code phase while the receiver circuitry includes a search/selection algorithm as well as some contention protocol to resolve code phase collisions. The transceiver 604 of each of the viewers 266e-266g in this embodiment is a CDMA receiver that suppresses self-reception interference, despreads the received signals at the various incoming codes phases, tracks those phases, and possibly mitigates multipath and/or interuser interference.

Because the mini-network 1010 of Figure 8 is fully meshed, it can operate under distributed control. Preferably, a receiver-oriented control protocol is utilized. Each of the viewers participating in a video conference call broadcasts its audio/video signal(s), and any viewer that receives the signal(s) performs the necessary processing to output the audio and video components in combination with those of other received signal(s). Preferably, the video portions of the incoming signals are scaled and displayed together in some arrangement on the display 602, while the audio portions of the incoming signals are summed, synchronized to the video, if necessary, so that a summed, synchronized audio signal is sounded from the speaker/microphone 608'.

2. Using a Library Unit as a Central Node

In Figure 9, the library unit 262c is used as a central node in the mini-network 1010, and connections 1200, 1205, 1210 link the library unit 262c to the viewers 266e-266g, respectively. The connections 1200, 1205, 1210 can be hardwired or wireless. Although Figure 9 depicts the connections 1200, 1205, 1210 in a star arrangement, other arrangements, such as a ring, for example, are possible. In cases where the connections 1200, 1205, 1210 share a common medium (e.g., a hardwired ring, or free space in the case of wireless connections), then a multiplexing scheme is necessary. Again, many well known multiplexing schemes are possible, including TDMA and FDMA, but the multiplexing scheme preferably utilizes CDMA techniques for wireless connections. In this case, the centralized node (i.e., the library unit 262c) allows a synchronous, orthogonal CDMA system to be utilized.

Specifically, synchronous orthogonal CDMA spreading codes, such as Walsh-Hadamard codes, are employed on the uplinks from each of the viewers 266e-266g to the library unit 262c;

meanwhile, a broadcast downlink is transmitted from the library unit 262c and received by each of the viewers 266e-266g. In one embodiment, the broadcast downlink is spread using one of the Walsh-Hadamard codes unused by the uplinks and includes control data for uplink timing and transmission power control feedback as well as call data comprising combined audio/video signal(s) from each viewer participating in the conference call.

In one embodiment, the library unit 262c provides centralized control of communications involved in a video conference call. Such centralized control may include call set-up, audio summing, and video combining. Alternatively, the library unit 262c can perform only switching and connectivity functions, while each of the viewers 266e-266g performs the control functions, just like in the case of a directly connected mini-network where there is no library unit 262c.

The access control of the library unit 262c can be modified to accommodate multiple viewer connections during a conference call. During typical use for delivery of electronic books, only a single viewer holds the encryption key for the library unit 262c. This is done in order to prevent unauthorized distribution of electronic books. As depicted in Figure 9, however, the library unit 262c may communicate with several viewers 266e-266g during a conference call. This can be accomplished by operating the library unit 262c in a "clear" mode during a conference call. Clear mode transmissions from the library unit 262c may be unencrypted or, preferably, clear mode transmissions from the library unit 262c utilize a common key to which all of the viewers 266e-266g have access.

B. Large Scale Network

The mini-network just described is capable of supporting calls between viewers in a relatively small geographical area, without involvement of the network 1000. For calls of greater range the network 1000 is necessary. National or worldwide connectivity is possible using the network 1000, which may take various forms, as described below, including hybrids of the following.

1. Cable Television Backbone

In one embodiment, the network 1000 utilizes a cable television transmission network. A cable television distribution network is described in U.S. Patent No. 5,559,549, which is hereby incorporated by reference. Generally, a cable television transmission network comprises headends, each of which serves a number of subscribers. The connection between a headend and a

subscriber may be metallic coaxial cable, optical fiber, or a hybrid, e.g., hybrid fiber-coax (HFC) systems. The most common cable networks today are HFC networks, but 100% fiber optic networks, i.e., fiber to the curb (FTTC), will be more prevalent in the future.

To support conference calling, the cable television network and the home interface to the cable network must support two-way communications. This can be accomplished by having separate physical fibers/cables or directional multiplexing on the same fibers/cables or some combination of both. For example, the frequency range between 5 MHZ and 42 MHZ is allocated for upstream (also called "uplink") transmissions (i.e., from a subscriber to a headend). In a typical HFC layout, there are separate optical fibers for upstream and downstream transmissions between a headend and each of several neighborhood fiber nodes, where signals are converted between optical and electrical forms. However, upstream and downstream transmissions are multiplexed together onto the same coaxial cable that links a fiber node to subscriber sites (e.g., homes, offices). Bidirectional amplifiers employing diplexers are typically utilized in the coaxial portion between a fiber node and subscriber sites. Further details of a bidirectional cable television system are contained in U.S. Application Serial No. 09/124,043, filed July 29, 1998, entitled METHOD AND APPARATUS FOR USING PROGRAMS WATCHED DATA, which is hereby incorporated by reference. An alternative use of the cable plant is via cable modem pairs between a viewer or library unit and a headend.

Further upstream from the cable headends are one or more operations centers. The general downstream functionality of an operations center is collecting programs and/or data, packaging the collected programs and/or data, and transmitting the packaged programs and/or data to headends. The link between an operations center and a headend may involve fixed terrestrial medium (e.g., cable/fiber), terrestrial microwave, satellite, or some combination of channels, although satellite channels are the most common presently. The link between a headend and an operations center may be bidirectional to support duplex calling between electronic viewers. Operations centers may be linked together to provide support over an even larger geographical area.

In direct broadcast satellite (DBS) systems, the headend is absent or bypassed, and the operations center communicates directly with the subscriber via satellite. To the extent that a DBS satellite link is bidirectional with sufficient upstream bandwidth, a DBS system may also be utilized to support calling between electronic viewers. As an alternative to the DBS system, a separate,

dedicated or proprietary system of satellites may be utilized with the present invention to provide a satellite backbone for the network 1000. Alternatively, diverse communication channels, such as telephony or the Internet, can be used to provide upstream communications in conjunction with a downstream satellite transmission. For example, a downstream satellite broadcast of audio and video from a teacher or professor along with upstream audio only transmissions from students via a diverse communication channel is well suited to distance learning applications using the conference calling capabilities of the present invention.

The extent to which bidirectional communication capability is present in the cable television system determines the support for calling between electronic viewers 266. In one embodiment, a central node within the network 1000 performs signal processing and coordination to establish and manage a multiparty video conference call, as described in greater detail below. A video conferencing central node may be combined or collocated with other equipment in the cable television network. For example, a central node may be associated with an operations center to provide national or regional coverage. A smaller scope of coverage may be supported by a central node associated with a headend. An even smaller scope of coverage may be supported by a central node associated with a fiber node. Continuing one step further, the mini-network, as described above, results when a central node is associated with a library unit.

2. Cellular Telephony Backbone

The cellular telephony system is a bidirectional communication network that can be utilized for calls between electronic book viewers 266 with cellular transceivers. Analog and digital cellular telephony systems are well known in the art and easily support two-party conference calls without video. Digital cellular systems are preferred for use with the present invention, because they offer greater bandwidth, which is necessary for transmission of video. A central node for video conferencing in a cellular network may be a cellular base station (i.e., at the center of a cell) or mobile switching station, which links many base stations together.

3. PCS Backbone

A wireless PCS (personal communication system) is another bidirectional communication network that is well known in the art and can be utilized for calls between electronic book viewers having PCS transceivers. The PCS may be, for example, a PCN.

4. PSTN Backbone

The PSTN (public switched telephone network) can be utilized with the present invention to communicate video conferencing calls among viewers 266 having a PSTN interface. The PSTN reaches worldwide and encompasses land lines (both metallic and fiber optic), terrestrial microwave links, and satellite links, as well as a large number of switching centers and exchanges. The PSTN is well known in the art, and in particular, multiparty conference calling in the PSTN is well known. Furthermore, schemes for video transmission via the PSTN are known in the art. For example, U.S. Pat. No. 5,563,882 (the '882 patent), which is hereby incorporated by reference, discloses a video conferencing system that utilizes ISDN (integrated services digital network) and the H.320 video telephone protocol. The '882 patent discloses a "multipoint control unit (MCU)," which is an example of a video conferencing central node, as used herein.

5. Hybrids

Hybrids of cable television networks, cellular telephony networks, PCNs, the PSTN, and other networks, such as the Internet, are possible. By way of example, some cable television networks presently provide interconnection to the PSTN and the Internet, so that a television cable can be the single communications conduit for a home or office. Further integration and interconnections to PCNs and/or cellular networks is technically straightforward and likely in the future.

V. Conferencing Processes and Methods

A. Call Establishment

A video conferencing call can be established in a variety of manners. One or more channels for combined audio, video, and possibly other data can be set up at the initialization of the call. Alternatively, video and possibly other data communication can be added to an existing call that initially carries less media or fewer media channels, such as an audio-only call, for example.

In any case, channels for the various media are typically requested by one of the call participants. Requests are communicated to a video conferencing central node via a signaling network that may be inband or out-of-band with respect to the media content of the call. In a circuit switched or connection oriented network, a request is processed by one or more video conferencing central node(s) so as to route the requested media channels, reserve adequate switch ports and/or configure various switches between the call participants as necessary to support the

requested media. For example, a request for video communication midstream in an audio-only call that is already established would prompt the video conferencing central node to configure its video switch to establish one or more connections of sufficient bandwidth to accommodate duplex video transmissions and possibly perform other processing to mark, join, or synchronize the video transmissions to the pre-existing audio communications. Further examples of requests schemes in a video conferencing system are disclosed in the '882 patent and U.S. Patent No. 5,896,128 (the '128 patent), which is hereby incorporated by reference. In a packet switched or connectionless network, requests as just described may not be necessary. In an asynchronous transfer mode (ATM) network, which has some qualitites of both circuit switching and packet switching, use of requests would be appropriately modified in accordance with well known understanding in the art.

It is also possible to add a party to an ongoing video conferencing call. For example, a point-to-point two-party call can be converted to a bridged three-party call. A technique for doing so without disruption to the call is disclosed in the '882 patent.

A particular participant may select which, if any, other participants of a conference call will be able to receive all or some of its signals. This selection may be made during initial call establishment or "on the fly." For example, if a party A to a three-way conference call among parties A-C wishes to disclose to party B something secretly from party C, party A may temporarily turn off the ability of party C to hear or view the signals of party A.

B. Viewer Signal Processing and Functions

A viewer 266 performs signal processing associated with the transmission and reception of call content. In regards to transmission, the audio signal sensed by the speaker/microphone 608' is converted to digital form and compressed. For voice or speech audio, the following families of algorithms are particularly suitable: pulse code modulation (PCM), delta modulation (DM) and linear predictive coding (LPC). Each of the above families of algorithms includes variations, such as differential and adaptive variations. Similarly, the video signal sensed by the camera 608" is converted to digital form and compressed. The fundamental techniques for image compression include vector quantization, discrete cosine transforms, and run-length encoding. Combinations of these techniques are also possible. For video sequences of images, interframe encoding based on motion prediction can be applied to provide further compression gains. These techniques as well as others are utilized in standard video compression algorithms, including low-rate MPEG and ITU

standard H.261 and H.263 for video conferencing, which are well known in the art. Any compression algorithm that produces acceptably low bit rates for video and/or audio transmission through the network and can be implemented in real time with acceptably small delay is suitable for use with the present invention. Encoding of video and audio may be distinct or interrelated. By way of example, MPEG is a combined standard for both video and audio. These and other features are disclosed in additional detail in the '128 patent.

In regards to reception, a viewer 266 executes a decompression algorithm corresponding to the compression algorithm. In addition, the viewer 266 may perform additional processing of the received signals. For example, the viewer 266 can deselect some or all other conference call participants for output on that particular viewer 266, scale video images, overlap video images, and otherwise customize the display and output characteristics. Furthermore, the viewer 266 may be programmed to automatically select the dominant speaker on the basis of the audio components of the conference call and enlarge the size and/or display resolution of the corresponding video output. These and other reception signal processing features are disclosed in the '128 patent cited above as well as U.S. Patent No. 5,801,756, which is hereby incorporated by reference.

Optionally, the video conferencing system can support more sophisticated remote participant controls of video and camera functions. For example, the viewer camera 608" may be electronically controllable (e.g., electronically steerable, focusing, zoom, pan, etc.) locally or remotely, and one or more other participating viewers 266 can command these electronically controllable aspects of the camera 608" to customize and dynamically alter the characteristics of the video image sensed by the camera 608". Alternatively, the same "camera" video effects may be achieved using signal processing techniques. Camera commands and related video manipulation commands can be communicated from the remote (controlling) viewer to the subject (controlled) viewer by a low rate signaling channel.

Other conferencing display controls are possible, including, for example: (1) round robin display in a predetermined sequence; (2) visual token passing, wherein everybody can see the participant who holds the token; (3) dominant voice activation, wherein whoever has the loudest audio signal is displayed; and (4) "Hollywood Squares" style display of all participants jointly in an arrangement such as a checkerboard.

Additional output manipulations are possible for non-video media. Examples of non-video media (besides audio) include electronic books, data files, documents, spreadsheets, graphics, programs, text streams, web pages, and interactive whiteboards. Each of the above can be contained within a window on the display 602 and sized, positioned and layered to suit the user's preferences. Alternately, each of the above can be provided as a picture-in-picture, as described in the above-cited Application Serial No. 09/335,268. According to one process of the present invention, a new object for display, when it is received at a viewer 266, is initially displayed as a small icon. When the user provides input to open the icon (e.g., by clicking it), the icon transforms into a window of default size and position. The user can then adjust the display characteristics of the window. In the case of an interactive whiteboard, each participant in the conference call may view and potentially edit the contents of the whiteboard, which is preferably a window on which simple drawings, graphics, and text may be entered. Each call participant sees the same version of the whiteboard, which is globally updated periodically or as necessary.

A receiving viewer 266 with sufficient memory can record a call in its entirety or selected components of a call, including one's own audio, video, or other components. The ability to store and later retrieve calls or call components is useful for record keeping, recollection or message delivery. The record function can be programmed to operate without a human user present at the receiving viewer 266. In this case, the record function provides the viewer 266 with the capability of an answering machine or voice mail system with video and/or other media embodiments. By way of illustration of this capability, an unattended viewer 266 may receive a video call from a calling party. The unattended viewer 266 answers the call automatically and transmits an audio/video greeting to the calling party. In response to the greeting, the calling party transmits an audio/video message to the unattended viewer 266, which records the message.

A receiving viewer 266 can also convert an audio message to text in accordance with algorithms (e.g., voice recognition) that are well known in the art. The resulting text file can be displayed on the display 602 of the viewer 266 or stored in memory, such as book memory 728, within the viewer 266. This feature is useful to produce a transcript of a call or to "listen" to a call or message silently. The same speech to text conversion capability can be utilized with outgoing calls or messages as well. By way of example, a user may choose to transmit her audio signal as a text stream in place of or in addition to her audio signal. The viewer 266 can also be programmed

to convert text to speech in accordance with well known algorithms. Such a feature is useful for users who have difficulty seeing or reading. Additional details of viewer conversion between speech and text are provided in the above-cited application serial no. 09/344,449.

C. Central Unit Functions

Some or all of the viewer functionality, as described in the preceding section can be performed by a video conferencing central node instead (or additionally). For example, the record and storage function can be easily, and in cases advantageously, located in a central storage node rather than distributed among viewers. As further examples, a central node can perform speech-text conversion and can store and manage an interactive whiteboard. Central unit recording, storage and management are desirable when the content of the video conference call concerns a lecture or presentation.

In a preferred embodiment, a video conferencing central node performs central combining for a conference call. Central combining simplifies the communication among the viewers 266 participating in a conference call by establishing full duplex connections having fixed or bounded bandwidth, one between each participating viewer 266 and the central node. The central node manages all aspects of the call and is ultimately responsible for the selection of information received by each participating viewer on its single channel. The central node receives all uplink transmissions of video, audio and possibly other media. The central node then makes various combinations of the uplink data, one combination being transmitted to each participating viewer 266. Each participating viewer 266 can customize its downlink combination and output display, as described above by communicating configurations commands to the central node, which effects the requested configuration. Further details of central combining for video conferencing is disclosed in the '128 patent already cited and U.S. Patent No. 5,657,096, which is hereby incorporated by reference.

Figure 10 illustrates central combining for a conference call among the three viewers 266a, 266b and 266c. A node 1025 is the central node for this call. Nodes 1030 and 1035 are utilized for connection of the viewer 266a. In this example, the network 1000 initially determines that the node 1025 would act as the central node. Upon establishment of the conference call, signaling within the network 1000 occurs to set up the node 1025 as the central node and to configure switches at the nodes 1030 and 1035 so as to make the connections as shown, in the case of circuit switching. In the case of packet switching, the illustrated routes may be ones or the most likely ones

of many possible routes for given packets. Signals such as video, audio, and/or other media generated or originating at the viewer 266a are transmitted to the central node 1025. Likewise, each of the viewers 266b and 266c transmit uplink signals to the central node 1025. In one embodiment, each of the viewers 266a-266c also transmits via signaling connections configuration information pertaining to its display setup and other functions. Based on this configuration information, the central node 1025 performs combining of data from some or all of the three uplinks to create three customized downlink signals -- one for each of the viewers 266a-266c -- and transmits the downlink signals along the paths shown. One skilled in the art will appreciate that uplink and downlink transmissions to/from a given viewer need not share the same path physically or logically.

In one embodiment, the central node 1025 performs audio combining. Typically, the audio uplink components from every other participating viewer 266 are summed to create a sum or combined audio signal, which is then transmitted to a participating viewer as part or all of its downlink transmission. Audio summation combining has the effect of allowing every call participant to hear all other participants, as occurs in a face to face conference. Optionally, a viewer's own uplink audio signal can be added to the sum downlink audio it receives, thus providing a side tone. The summation can be a weighted sum and the weighting can be altered dynamically. For example, relative audio weights, and thus amplification, can be in proportion to the size of that speaker's corresponding video image on a particular viewer screen. As another example, the relative audio weight of the dominant speaker at any time may be increased. The time relationship between the component audio signals and their corresponding video signals is maintained and synchronized as necessary. Those skilled in the art will appreciate these and many other variations and features from well known techniques of audio conferencing.

In an embodiment of the present invention, the central node 1025 performs video processing to combine various video components of a video conferencing call. In the simplest case, the central node 1025 switches video signals from one or more uplinks to a given downlink without processing the content of the video signals. In this case, each viewer performs any video content processing. In a more active role, the central node 1025 performs substantive processing of the uplink video signals to create a composite video signal for each participating viewer 266. In this more active role, the central node 1025 can select from the available uplink video images (still or

moving) as well as other media, position and scale the images. Downward scaling (shrinking) of images may result in a reduction of resolution compared to the corresponding video uplink signal. Upward scaling (enlargement or magnification) of images may produce a coarser image whose resolution can be enhanced using well known techniques, such as, for example, image interpolation and edge enhancement. The composite image for each participating viewer 266 is then encoded for transmission. Standard digital encoding formats for moving video are preferred, such as, for example, an MPEG, H.261 or H.263 format.

Figure 11 is a block diagram of the video conferencing central node 1025. The central node 1025 contains circuitry to perform the functions just described, including a video combiner 1410, audio summation combiner 1415, and a switch 1420. The central node 1025 also contains a synchronizer 1425 to adjust relative timing between audio and video signals as necessary and a memory 1430 in which signals can be recorded for future retrieval and playback. A signaling module 1435 transmits and receives signaling information to/from viewers and other nodes. Finally, a controller 1440 controls the operation of the other circuitry. Those skilled in the art will recognize that other arrangements than the one illustrated in Figure 11 are possible and that another node or central node may contain less than all of the illustrated circuitry.

VI. Applications

The present invention provides synergistic effects from the combined convenience of viewing electronic books in association with participating in a video conference call.

At the most basic level, the viewer 266 of the present invention provides the advantages and convenience of a single device that can perform the dual functions of viewing electronic books and participating in conference calls. The combination takes advantage of common components, such as the display 602 and communication capability, that can be utilized for both functions. The viewer 266 is simpler to transport and utilize than two or more separate devices. Furthermore, the portability of the viewer 266, especially when utilizing wireless communications, enables it to be used in a variety of settings, including at the home and office, while traveling, even at a beach.

Another example of the synergistic advantages of the present invention is the ability to initiate a conference call while viewing an electronic book. The electronic book may be directly pertinent to the conference call. For example, the electronic book may be a directory or listing of

call connection numbers, addresses, or the like, such as a "White Pages", "Yellow Pages" or a personal contact booklet. While or soon after viewing the electronic book directory on a viewer 266 to look up one or more parties to call, a conference call can be established conveniently using the same viewer 266. The viewer 266 can be programmed to mask the connection number or address from the user, so that a user need only deal with the called parties name or "handle" that is more familiar. In particular, a user can simply highlight, click or otherwise select a name from the directory, and the viewer will automatically capture the appropriate connection information and initiate the call. A directory can also be used in this manner to add a new party to an existing call.

As another example, the electronic book may be a merchandise catalog. While reading the catalog, a user can initiate a call to a store or seller to order an item in the catalog or to obtain additional information. The electronic book catalog can be written to accommodate easy and automated calling in relation to the catalog contents. For example, a user may highlight, click or otherwise select an item in the catalog and press a single button (e.g., a "dial" or "connect" button) to place the call. In certain embodiments, the call may be a conference call in which the selected items are auctioned and the callers are live participants in the auction. More generally, the electronic book need not be a catalog, but can be any publication containing an advertisement for stores, merchandise or special information services (e.g., sports results, weather information, astrology, dealer locator services, or adult entertainment) that can be called.

Other synergistic effects occur when the electronic book is not directly pertinent to the conference call. A user engaged in viewing an electronic book can initiate or receive a call with minimal disruptive effect because the call and the electronic book are seen and/or heard on the same viewer 266. Furthermore, the user can automatically mark an active electronic book at the current page or position when a call is initiated or received, to further ease resumption of reading the electronic book after conclusion of the call. A user participating in a conference call that the user finds boring or disruptive can inconspicuously and conveniently read an electronic book on the same viewer 266 while feigning interest in the conference call. When the display 602 of the electronic book viewer 266 is actually two separate screens, one screen can display the electronic book or text while the other screen can be utilized to display the video conference. For incoming calls, caller identification ("caller ID") can be performed in accordance with well known techniques in the art, and the caller identification can be conveniently displayed on the display 602.

Perhaps most importantly, the present invention finds advantageous use in distance learning applications. Textbooks and lecture or presentation materials (e.g., an outline or slide show of the lecture or presentation) can take the form of electronic books, and lectures, presentations or discussions can be conducted as video conference calls. In one preferred arrangement, video is broadcast from the professor or presenter to all participants in the call while audio only from all call participants (including the professor or presenter) is combined so that all can hear all others' audio, though only the professor or presenter can be seen. In this way, questions and answers can be exchanged. In another preferred arrangement, a visual token passing scheme is employed, wherein the professor or presenter is the default token holder, but the professor or presenter can pass the token to a student or audience member so that everyone can sees the student or audience member's camera 608" video when, for example, the student or audience member asks a question. Interactive whiteboards are desirably incorporated into the conference call to facilitate student questions or input that is more naturally expressed non-verbally (such as sketches or mathematical formula). Text files, text banner, graphics files, video clips, computer programs, and other data is also advantageously incorporated into the conference call to aid in effective communication and learning. For example, the professor or presenter may play a video recording or run a computer simulation as part of a lecture or presentation.

The present invention provides many other benefits and advantages when used in distance learning applications. For example, students need only have a single, lightweight viewer 266, rather than a large number of bulky and heavy books. A viewer 266 with sufficient memory capacity can easily store all the books used by a busy student over the course of a semester. As another example, the speech-to-text capabilities of the present invention simplify note-taking by students. As a further example, the ability to store some or all components of a distance learning conference call lecture enables students who were "absent" from the lecture to easily view the missed lecture. Also, a student wishing to review a particular topic can easily access the lecture covering the topic for retrieval and replay, without having to meet a professor during office hours just to have the professor repeat what was said in the lecture. When a student does require consultation with a professor, the consultation can take the form of a conference call, and relevant sections of a textbook (e.g. an assigned homework problem) can be displayed and discussed conveniently. Professor-student consultations can also advantageously utilize the whiteboards provided by the

present invention. Schools and universities can utilize the present invention to offer distance learning classes to a very large number of students economically, without the traditional physical constraints of room size and capacity of physical facilities.

In short, the present invention can revolutionize campuses and the educational process, sparking a new renaissance of learning, much like Gutenberg's moveable typeset printing did over 500 years ago.

The terms and descriptions used herein are set forth by way of illustration only and are not meant as limitations. Those skilled in the art will recognize that numerous variations are possible within the spirit and scope of the invention as defined in the following claims and their equivalents.

What is claimed is:

1. An electronic book viewer comprising:

a memory in which data representing an electronic book can be stored;

a video display, connected to the memory, from which the electronic book can be displayed;

a speaker;

a microphone;

a transmitter connected to the microphone; and

a receiver connected to the speaker, wherein the transmitter and the receiver have sufficient bandwidth to accommodate a conference call, whereby the electronic book viewer can be utilized in a conference call.

2. The electronic book viewer of claim 1 wherein the video display is connected to the receiver, and the conference call includes video received by the electronic book viewer.

3. The electronic book viewer of claim 1 further comprising:

a camera connected to the transmitter, whereby the conference call includes video transmitted from the electronic book viewer.

4. The electronic book viewer of claim 3 wherein the camera is electronically controllable.

5. The electronic book viewer of claim 4 wherein the receiver receives commands to control the camera.

6. The electronic book viewer of claim 1 wherein the transmitter and the receiver comprise one of the group consisting of a wireless transceiver, a CDMA transceiver, a cable television transceiver, a cellular telephone transceiver, a PCS transceiver, a PSTN modem, and a satellite transceiver.

7. The electronic book viewer of claim 1 wherein the receiver comprises a satellite receiver.

8. The electronic book viewer of claim 1 wherein the receiver has a bandwidth greater than a bandwidth of the transmitter.

9. The electronic book viewer of claim 1 further comprising:

a processor connected to the memory, the video display, the speaker, and the microphone; and

conference calling software for execution on the processor.

10. The electronic book viewer of claim 1 wherein the electronic book viewer is portable.

11. The electronic book viewer of claim 1 wherein the video display comprises two screens.

12. The electronic book viewer of claim 11 wherein the video display is connected to the receiver, and the conference call includes video received by the electronic book viewer, and wherein an electronic book can be displayed on a first of the two screens while the video of the conference call is simultaneously displayed on a second of the two screens.

13. An electronic book viewer comprising:

a memory in which data representing an electronic book can be stored;

a video display, connected to the memory, from which the electronic book can be displayed;

a speaker;

a microphone;

a receiver connected to the speaker;

a transmitter connected to the microphone;

a processor connected to the memory, the video display, the speaker, the microphone, the receiver and the transmitter; and

conference calling software executing on the processor, whereby the electronic book viewer can be utilized in a conference call.

14. The electronic book viewer of claim 13 wherein the video display is connected to the receiver, and the conference call includes video received by the electronic book viewer.

15. The electronic book viewer of claim 13 further comprising:

a camera connected to the transmitter, whereby the conference call includes video transmitted from the electronic book viewer.

16. The electronic book viewer of claim 15 wherein the camera is electronically controllable.

17. The electronic book viewer of claim 16 wherein the receiver receives commands to control the camera.

18. The electronic book viewer of claim 13 wherein the transmitter and the receiver comprise one of the group consisting of a wireless transceiver, a CDMA transceiver, a cable television transceiver, a cellular telephone transceiver, a PCS transceiver, a PSTN modem, and a satellite transceiver.

19. The electronic book viewer of claim 13 wherein the receiver comprises a satellite receiver.

20. The electronic book viewer of claim 13 wherein the receiver has a bandwidth greater than a bandwidth of the transmitter.

21. The electronic book viewer of claim 13 wherein the electronic book viewer is portable.

22. The electronic book viewer of claim 13 wherein the video display comprises two screens.

23. The electronic book viewer of claim 22 wherein the video display is connected to the receiver, and the conference call includes video received by the electronic book viewer, and wherein an electronic book can be displayed on a first of the two screens while the video of the conference call is simultaneously displayed on a second of the two screens.

24. A conferencing system comprising:

at least one electronic book viewer comprising:

a memory in which data representing an electronic book can be stored;

a video display, connected to the memory, from which the electronic book can be displayed;

a speaker;

a microphone; and

a transmitter connected to the microphone; and

a receiver connected to the speaker, wherein the transmitter and the receiver have sufficient bandwidth to accommodate a conference call, whereby the electronic book viewer can be utilized in a conference call;

at least one end equipment; and

an interconnection network capable of linking two or more of the at least one electronic book viewer and the at least one end equipment in a conference call.

25. The conferencing system of claim 24 wherein the least one end equipment is another electronic book viewer.

26. The conferencing system of claim 24 wherein the interconnection network comprises a direct connection between the at least one electronic viewer and the at least one end equipment.

27. The conferencing system of claim 26 wherein the direct connection is a hardwired connection.

28. The conferencing system of claim 27 wherein the hardwired connection comprises at least one from the group consisting of in-home telephone wiring, in-home power wiring in-home coaxial cable, and a computer network.

29. The conferencing system of claim 26 wherein the direct connection is a wireless connection.

30. The conferencing system of claim 29 wherein the wireless connection comprises at least one from the group consisting of a radio frequency link and an infrared link.

31. The conferencing system of claim 24 wherein the interconnection network comprises:

a library unit; and

a connection between the library unit and one or more of the at least one electronic book viewers.

32. The conferencing system of claim 31 wherein the connection is a hardwired connection.

33. The conferencing system of claim 32 wherein the hardwired connection comprises at least one from the group consisting of in-home telephone wiring, in-home power wiring in-home coaxial cable, and a computer network.

34. The conferencing system of claim 31 wherein the connection is a wireless connection.

35. The conferencing system of claim 34 wherein the wireless connection comprises at least one from the group consisting of a radio frequency link and an infrared link.

36. The conferencing system of claim 31 wherein the interconnection network further comprises:

a set top terminal connected to the library unit.

37. The conferencing system of claim 36 wherein the interconnection network further comprises:

a video distribution system connected to the set top terminal via a two way communication path.

38. The conferencing system of claim 37 wherein the video distribution system is a cable television system.

39. The conferencing system of claim 37 wherein the video distribution system is a direct broadcast satellite television system.

40. The conferencing system of claim 24 wherein the interconnection network comprises one or more of the group consisting of a cellular telephone network, a PCS, the public switched telephone network, the Internet, a LAN, and a satellite communication network.

41. The conferencing system of claim 24 wherein the interconnection network comprises a central combining node.

42. The conferencing system of claim 41 wherein the central combining node comprises a video combiner.

43. The conferencing system of claim 41 wherein the central combining node comprises an audio signal summation module.

44. The conferencing system of claim 41 wherein the central combining node comprises a switch.

45. The conferencing system of claim 41 wherein the central combining node comprises a controller.

46. The conferencing system of claim 41 wherein the central combining node comprises a signaling module.

47. The conferencing system of claim 41 wherein the central combining node comprises a memory capable of storing components of the conference call.

48. The conferencing system of claim 47 wherein the stored components of the conference call comprise at least one selected from the group consisting of an audio signal, a video signal, a program file, a data file, a text file, and an electronic book.

49. The system of claim 24 wherein at least one electronic book viewer further comprises:

a processor connected to the memory, the video display, the speaker, and the microphone; and

conference calling software for execution on the processor.

50. A method of conferencing using an electronic book viewer, the method comprising:

displaying an electronic book on the electronic book viewer;

participating in a conference call while viewing the electronic book; and

communicating information content of the conference call with the electronic book viewer.

51. The method of claim 50 wherein the participating step comprises:

initiating a conference call to one or more called parties while viewing the electronic book.

52. The method of claim 51 further comprising:

marking a current page position in the electronic book in response to the initiating step.

53. The method of claim 50 wherein the call is related to the electronic book.

54. The method of claim 53 wherein the electronic book is a directory of call initiation data and an entry of the directory relates to at least one of the one or more called parties.

55. The method of claim 54 wherein the directory of call initiation data is a personalized directory.

56. The method of claim 54 wherein the directory of call initiation data is a public directory.

57. The method of claim 54 wherein an entry of the directory comprises information concerning availability of conference calling features for the entry.

58. The method of claim 57 wherein the conference calling features comprise at least one selected from the group consisting of audio capability, video reception capability, video transmission capability, and electronic book viewing capability.

59. The method of claim 53 wherein the electronic book is a merchandise catalog.

60. The method of claim 53 wherein the electronic book contains an advertisement of a business, and the called party is the business.

61. The method of claim 53 wherein the conference call is a distance learning conference call and the electronic book pertains to the learning.

62. The method of claim 50 further comprising:

customizing the conference call.

63. The method of claim 50 further comprising:

dynamically adding or dropping components to the conference call.

64. The method of claim 50 further comprising:

storing one or more components of the conference call.

65. The method of claim 64 wherein the storing step is performed at the electronic viewer.

66. The method of claim 64 wherein the storing step is performed at a node in a network connecting the call.

67. The method of claim 64 further comprising:

retrieving some or all of the stored components of the conference call after termination of the conference call.

68. The method of claim 67 further comprising:

authorizing access to the stored components of the conference call before the retrieving step.

69. The method of claim 50 wherein the participating step comprises:

receiving a conference call while displaying the electronic book.

70. The method of claim 69 further comprising:

marking a current page position in the electronic book in response to the receiving step.

71. The method of claim 69 further comprising:

displaying an identification of a caller or calling equipment.

72. The method of claim 50 wherein the conference call comprises speech, the method further comprising:

converting at least some of the speech to text.

73. The method of claim 50 wherein displaying step is performed subsequent to the initiation of the participating step.

74. A method of distance learning using an electronic book viewer, the method comprising:

displaying learning material as an electronic book on the electronic book viewer;

participating in a conference call while displaying the electronic book; and

communicating information content of the conference call with the electronic book viewer.

75. The method of claim 74 wherein the learning material comprises a textbook.

76. The method of claim 74 wherein the learning material comprises an outline.

77. The method of claim 74 wherein the communicating step comprises receiving a video signal at the electronic book viewer, and the method further comprises:

displaying a video image related to the video signal on the electronic book viewer.

78. The method of claim 74 wherein the communicating step comprises transmitting audio information from the electronic book viewer.

79. The method of claim 78 wherein the audio information is a question.

80. The method of claim 74 further comprising:

storing at least some of the conference call.

81. The method of claim 80 further comprising:

retrieving the stored conference call.

82. The method of claim 74 wherein the conference call comprises speech, the method further comprising:

converting at least some of the speech to text.

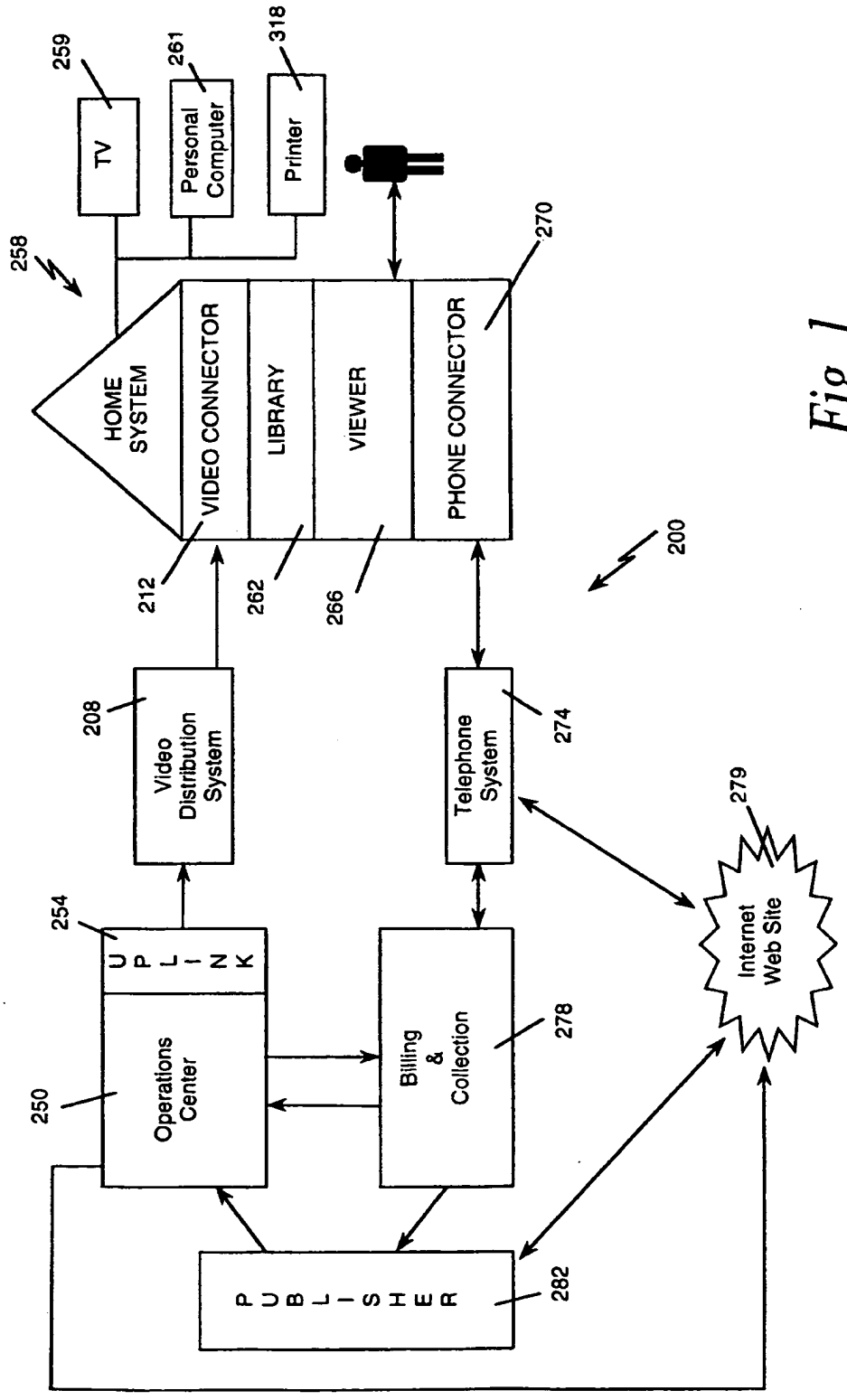

259
TV
261
Personal Computer
318
Printer
258
270
HOME SYSTEM
VIDEO CONNECTOR
LIBRARY
VIEWER
PHONE CONNECTOR
212
262
266
200
208
Video Distribution System
Telephone System
274
279
Internet Web Site
254
U P L I N K
Operations Center
250
Billing & Collection
278
P U B L I S H E R
282

Fig. 1

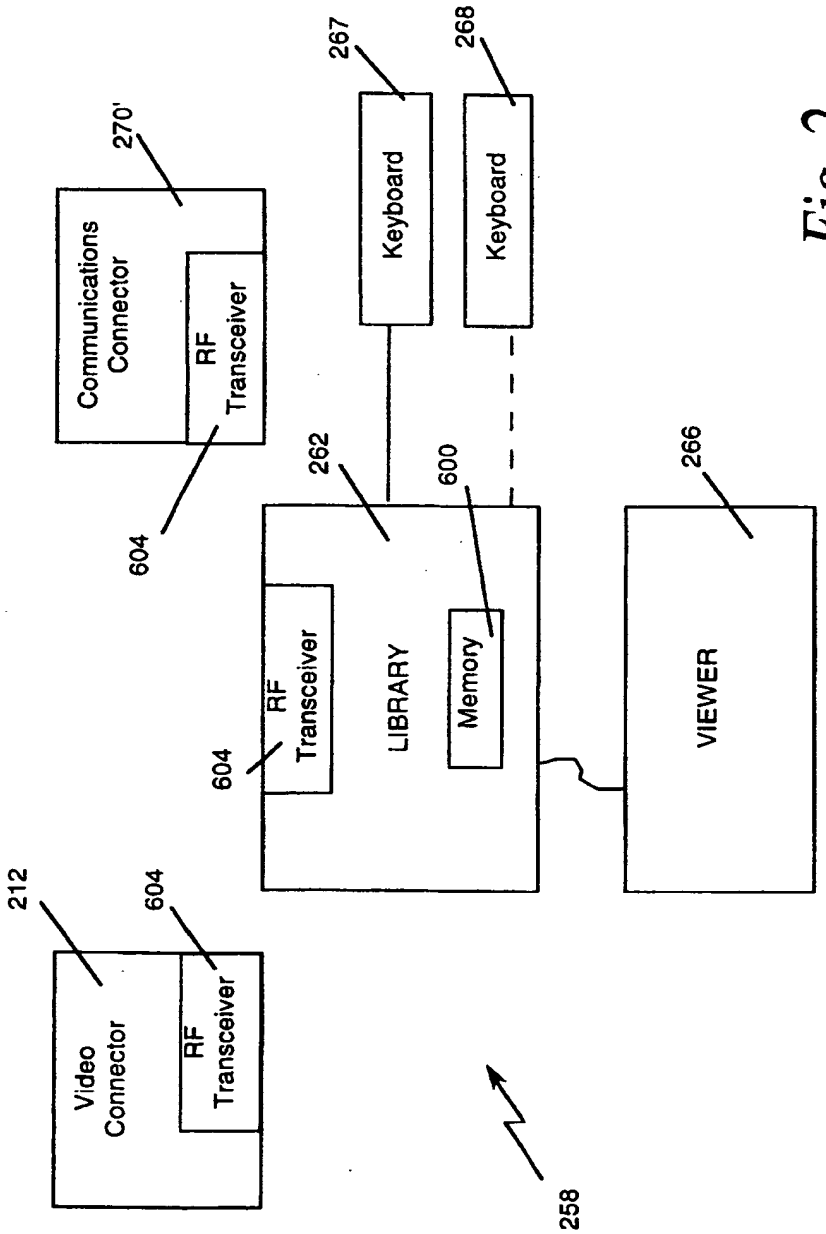

267
268
270'
Keyboard
Keyboard
Communications Connector
RF Transceiver
604
262
600
266
RF Transceiver
LIBRARY
Memory
VIEWER
604
212
604
Video Connector
RF Transceiver
258

Fig. 2

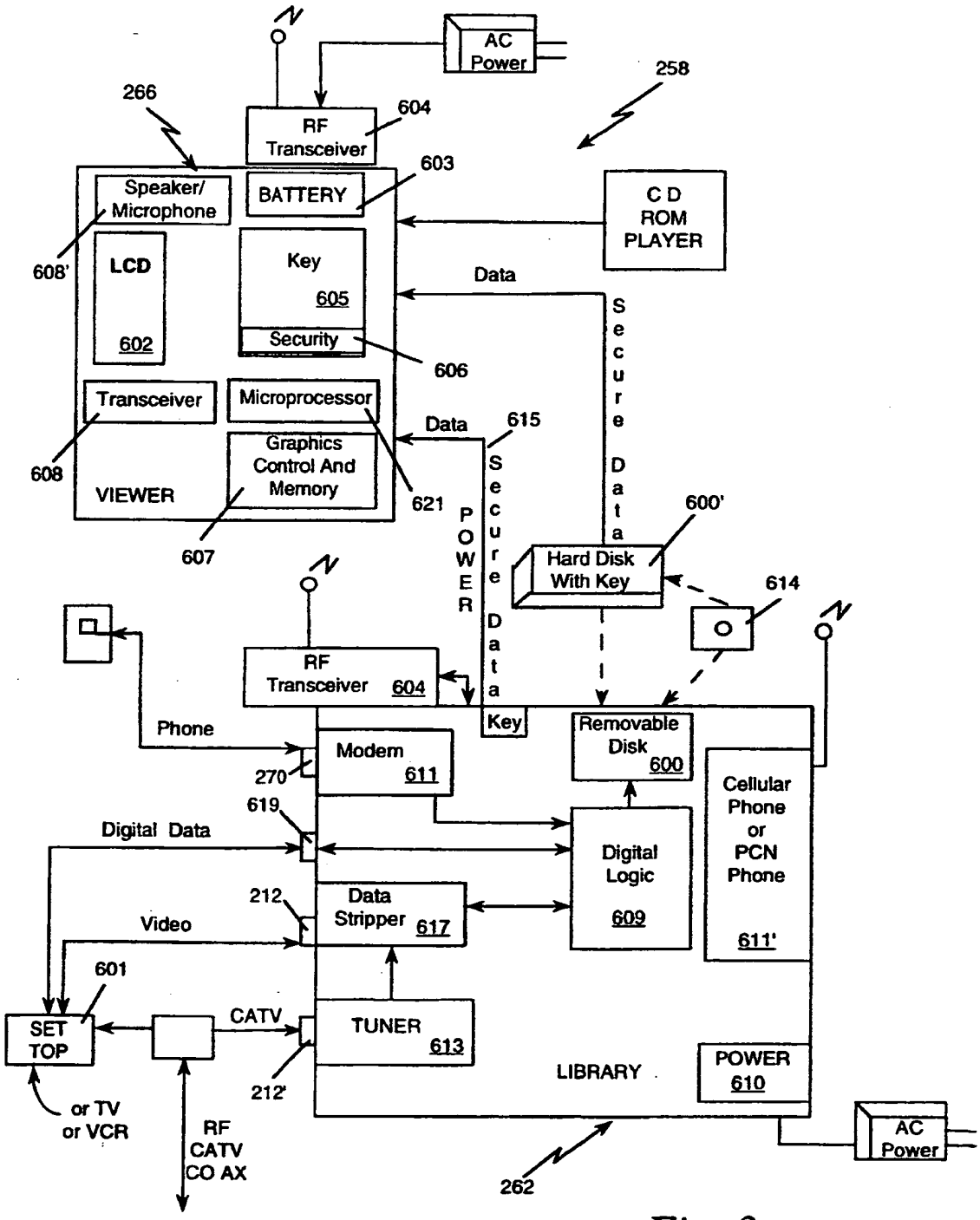

AC Power
258
266
RF Transceiver
604
603
Speaker/ Microphone
BATTERY
C D ROM PLAYER
608'
LCD
602
Key
605
Security
606
Data
Secure Data
Transceiver
608
Microprocessor
Data
615
Graphics Control And Memory
VIEWER
621
607
POWER
Secure Data
600'
Hard Disk With Key
614
RF Transceiver 604
Key
Removable Disk 600
Phone
Modem 611
270
619
Digital Data
Digital Logic 609
Cellular Phone or PCN Phone 611'
212
Data Stripper 617
Video
601
SET TOP
CATV
TUNER 613
212'
LIBRARY
POWER 610
or TV or VCR
RF CATV CO AX
262
AC Power

Fig. 3

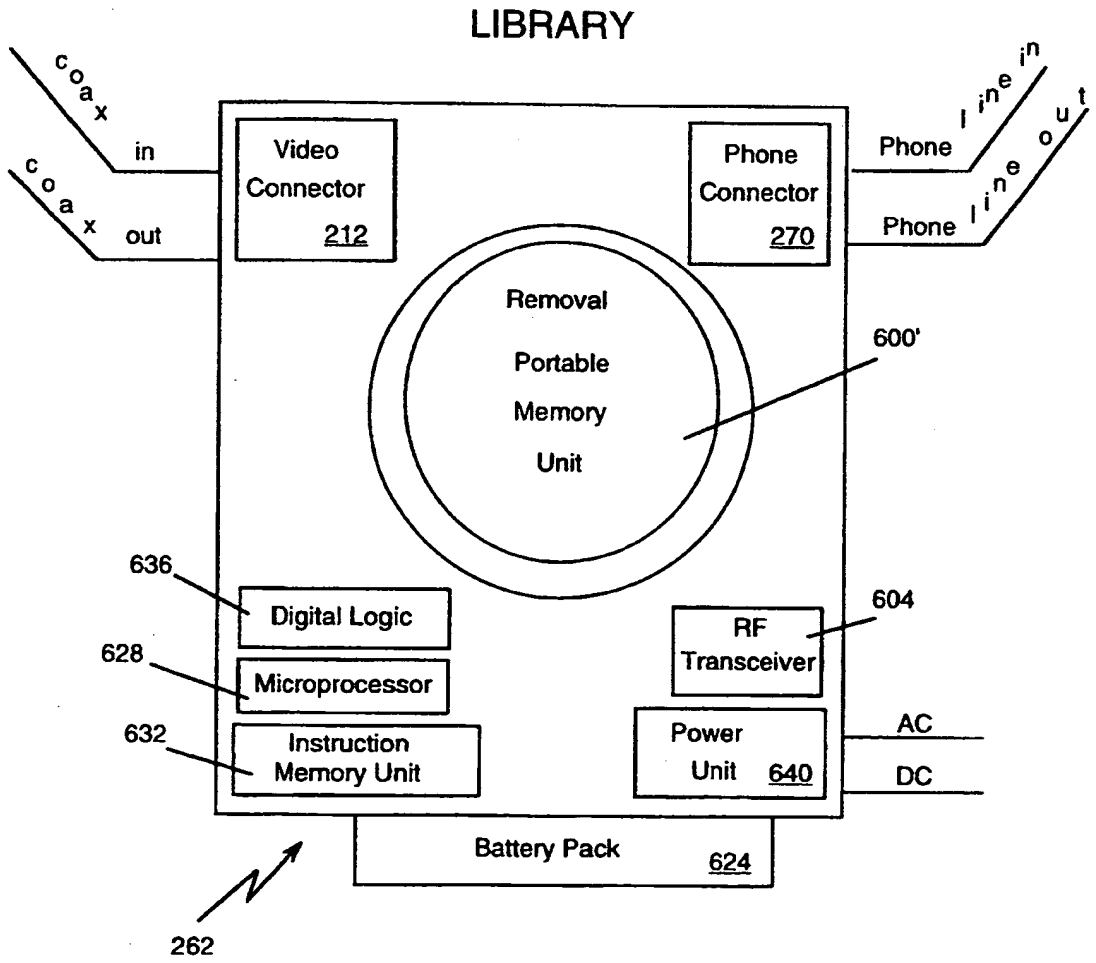

LIBRARY
coax in
coax out
Video Connector 212
Phone Connector 270
Phone line in
Phone line out
Removal Portable Memory Unit
600'
636
Digital Logic
628
Microprocessor
632
Instruction Memory Unit
604
RF Transceiver
Power Unit 640
AC
DC
Battery Pack 624
262

Fig. 4

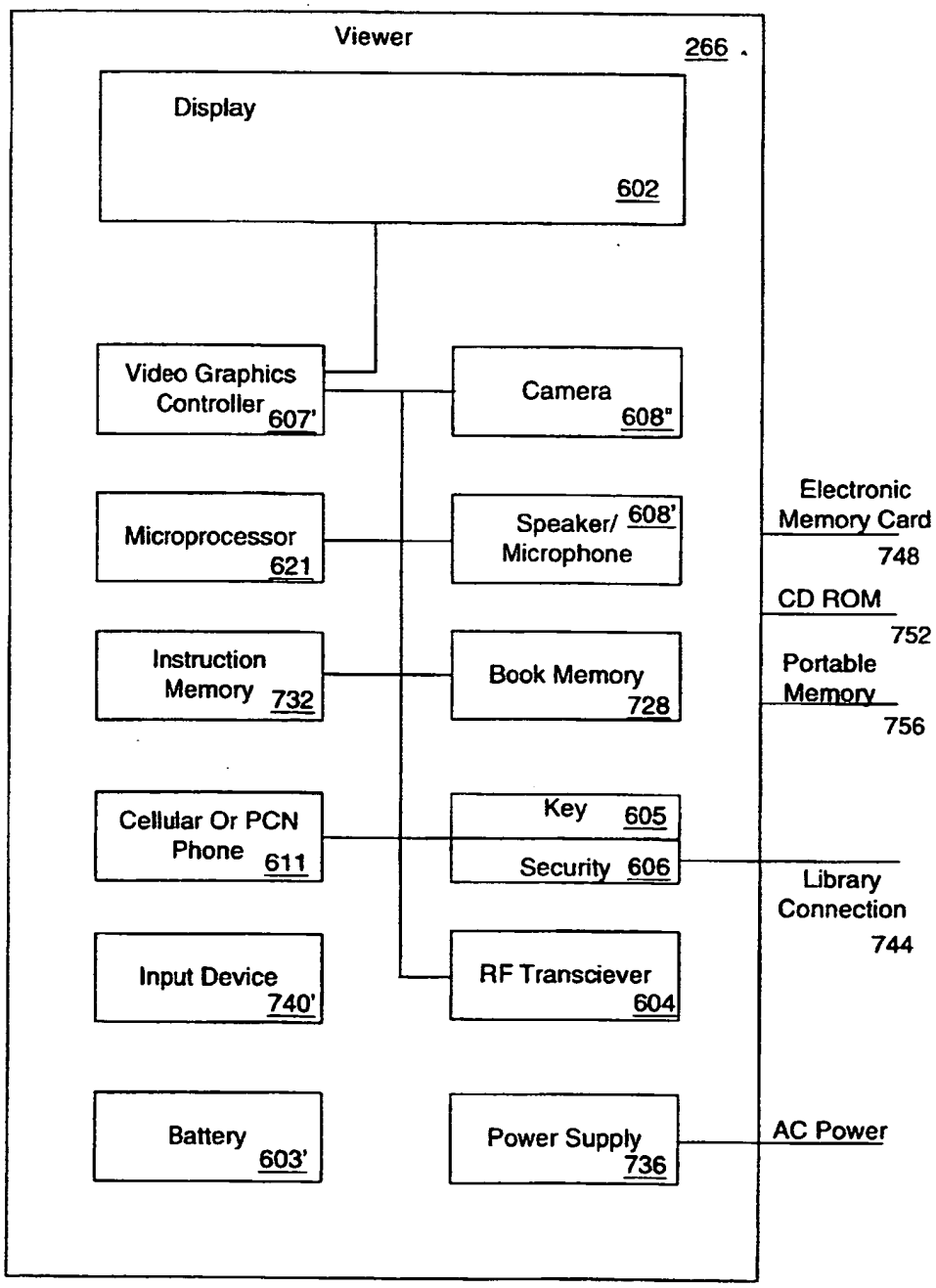

Viewer
266
Display
602
Video Graphics Controller 607'
Camera 608"
Microprocessor 621
Speaker/ Microphone 608'
Instruction Memory 732
Book Memory 728
Cellular Or PCN Phone 611
Key 605
Security 606
Input Device 740'
RF Transciever 604
Battery 603'
Power Supply 736
Electronic Memory Card 748
CD ROM 752
Portable Memory 756
Library Connection 744
AC Power

Fig. 5

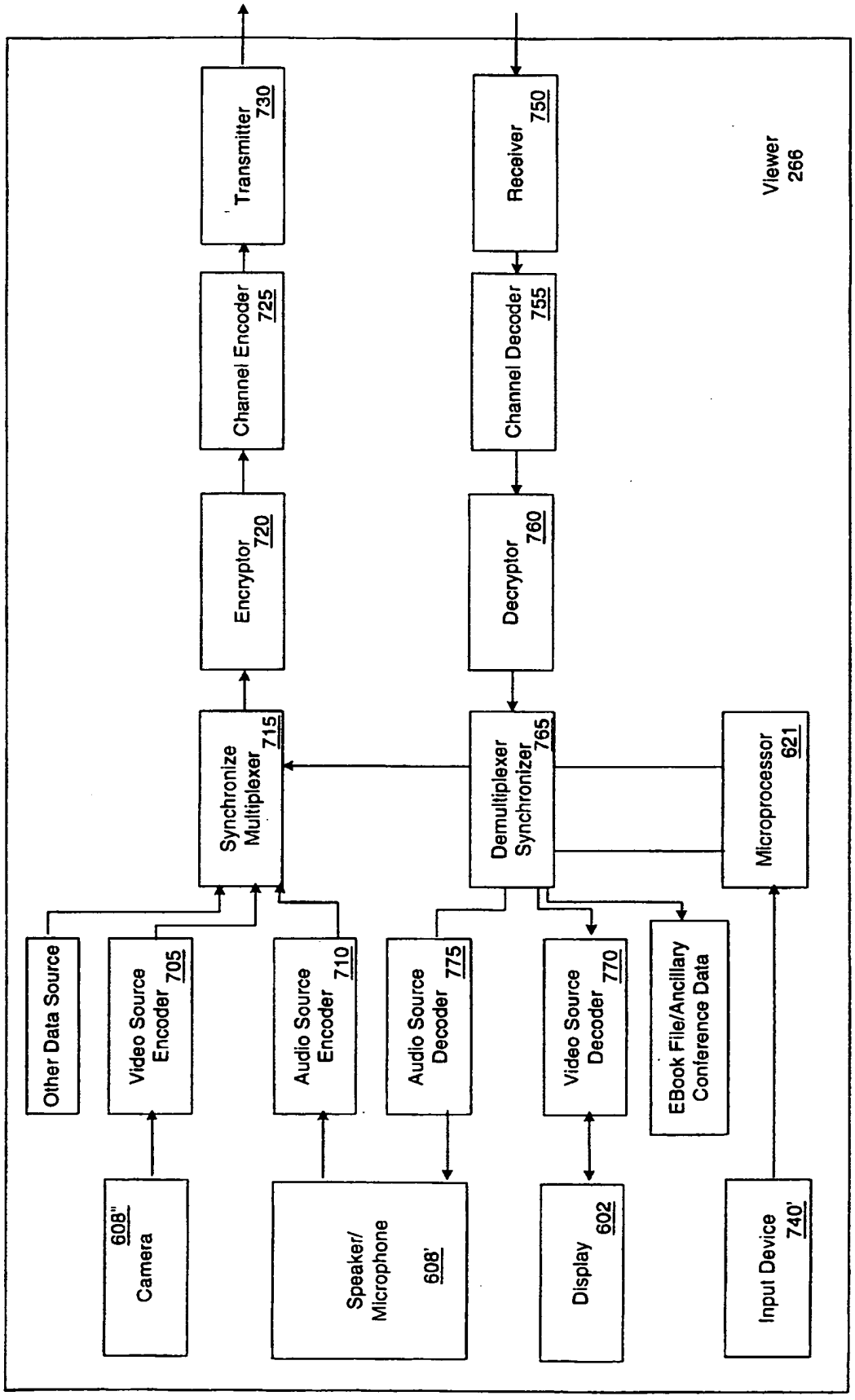

Viewer 266
Transmitter 730
Channel Encoder 725
Encryptor 720
Synchronize Multiplexer 715
Other Data Source
Video Source Encoder 705
Audio Source Encoder 710
608" Camera
Speaker/ Microphone 608'
Receiver 750
Channel Decoder 755
Decryptor 760
Demultiplexer Synchronizer 765
Audio Source Decoder 775
Video Source Decoder 770
Display 602
EBook File/Ancillary Conference Data
Microprocessor 621
Input Device 740'

Fig. 6

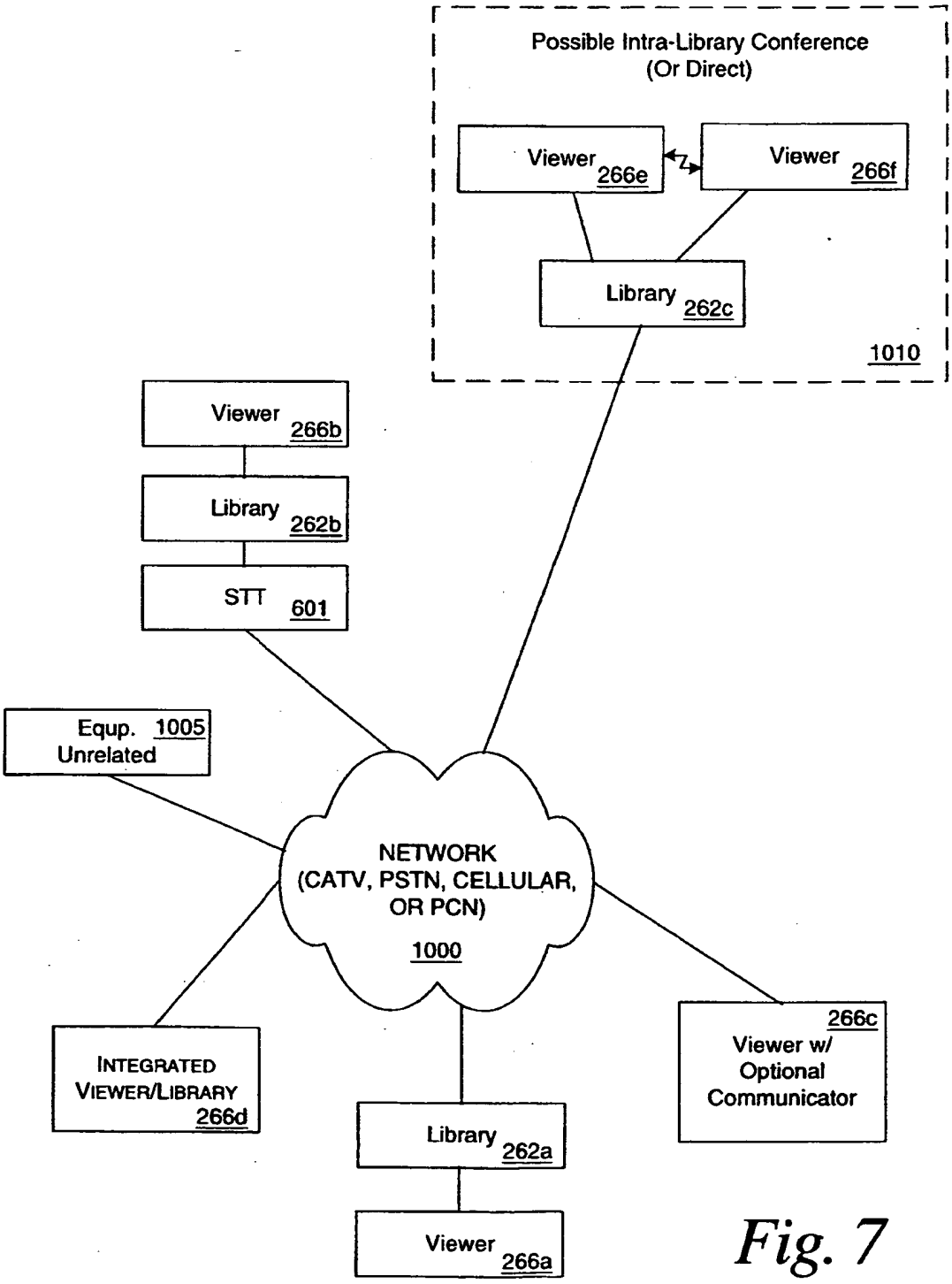

Possible Intra-Library Conference
(Or Direct)
Viewer 266e
Viewer 266f
Library 262c
1010
Viewer 266b
Library 262b
STT 601
Equp. 1005
Unrelated
NETWORK
(CATV, PSTN, CELLULAR,
OR PCN)
1000
INTEGRATED
VIEWER/LIBRARY
266d
Library 262a
Viewer 266a
266c
Viewer w/
Optional
Communicator

Fig. 7

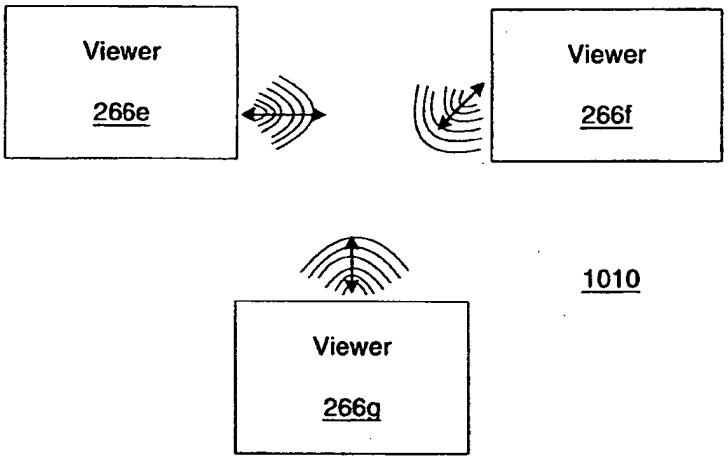

Viewer
266e
Viewer
266f
Viewer
266g
1010

Fig. 8

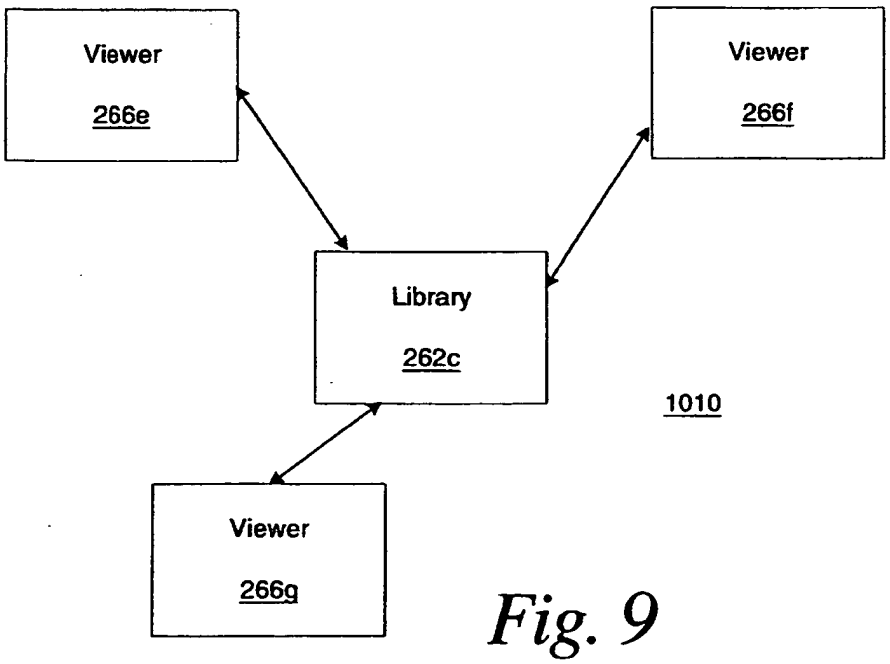

Viewer
266e
Viewer
266f
Library
262c
1010
Viewer
266g

Fig. 9

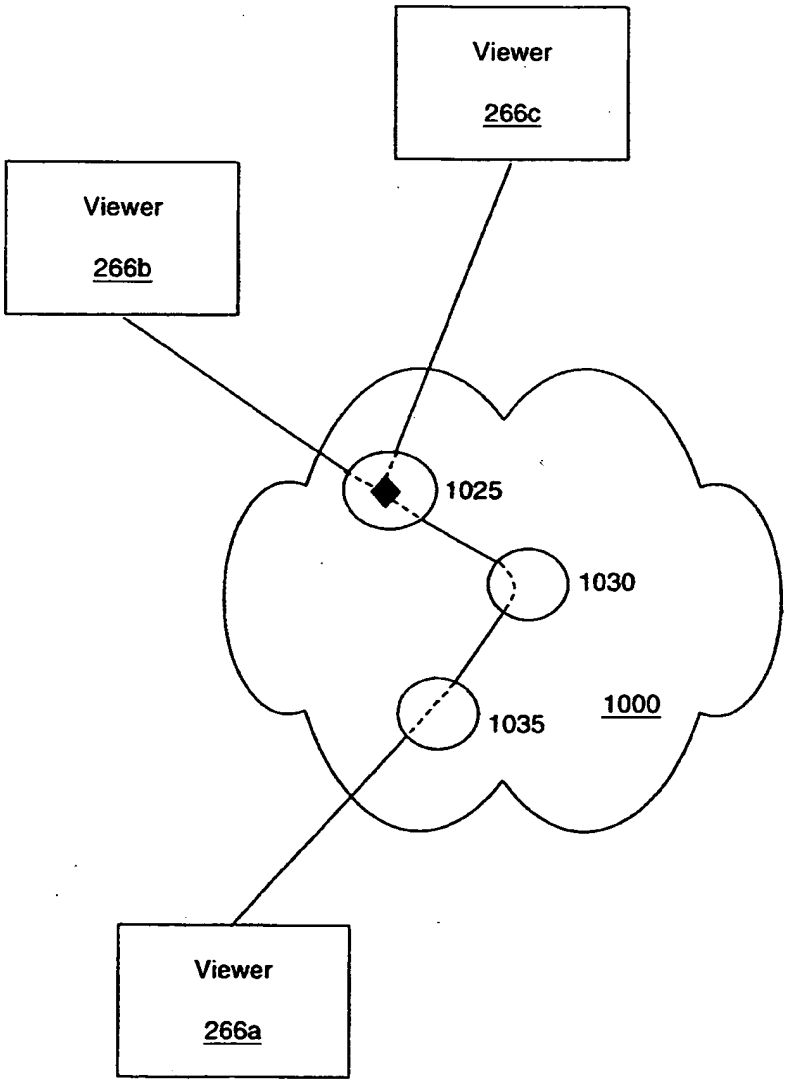


Fig. 10

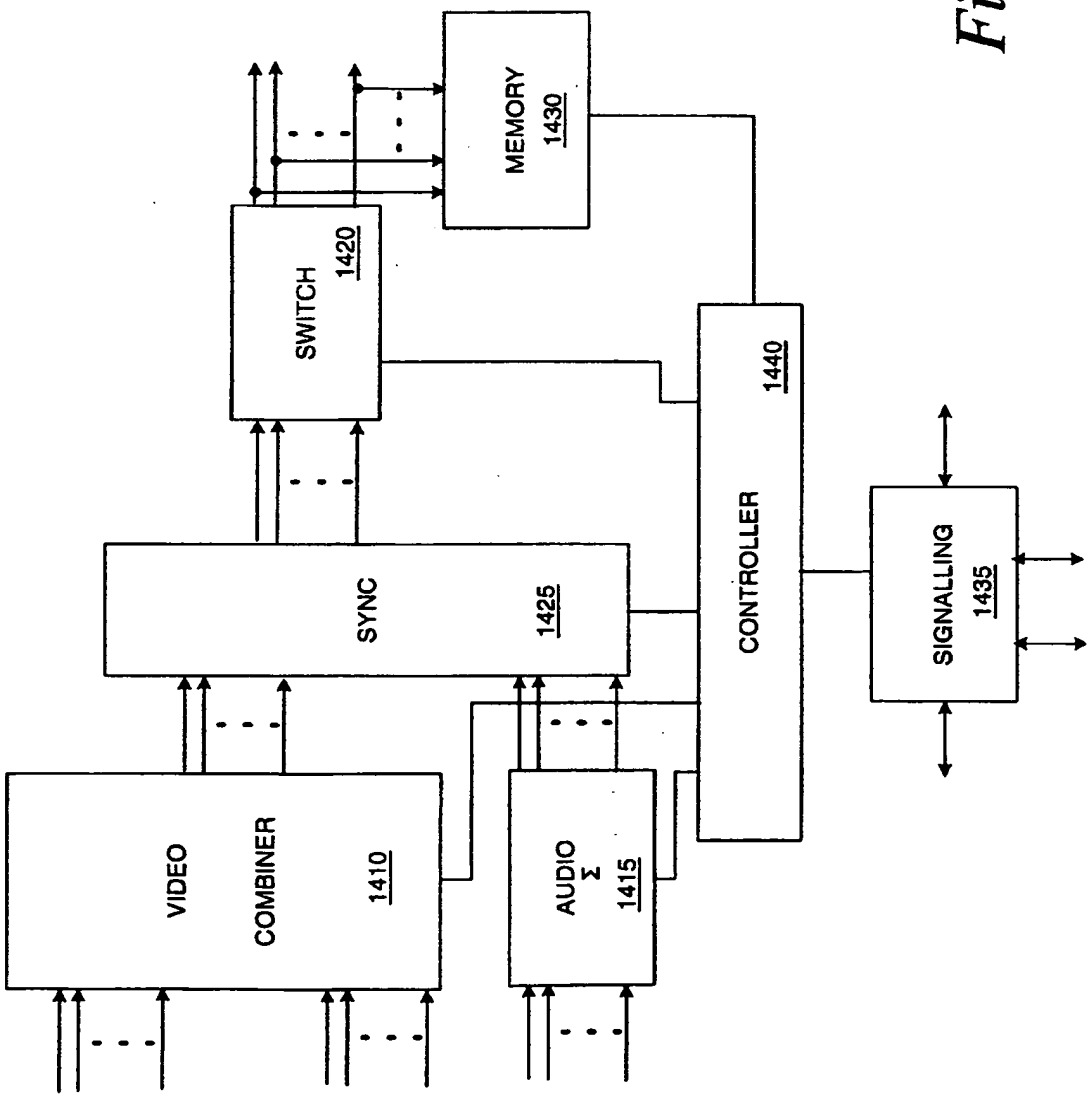

MEMORY
1430
SWITCH
1420
SYNC
1425
CONTROLLER
1440
SIGNALLING
1435
VIDEO
COMBINER
1410
AUDIO
Σ
1415

Fig. 11

INTERNATIONAL SEARCH REPORT

Int\ ional Application No
PCT/US 00/24819

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F15/02 H04N5/00 H04N7/14 H04N7/15

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 44144 A (HEUTSCHI THEODOR ;INTERNOVA HOLDING AG (CH)) 2 September 1999 (1999-09-02)	1-3,6,7, 10, 13-15, 18,19, 24-35, 40, 49-53, 59-62, 69,70, 74-82
Y	page 4, line 21 - line 26 page 5, line 19 - line 23 page 6, line 20 -page 12, line 23 figures 1-12 --- -/--	11,12, 22,23

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
30 November 2000	07/12/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Van der Zaal, R

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/US 00/24819

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 97 20274 A (MUNYAN DANIEL E ;EVERYBOOK DELAWARE INC (US)) 5 June 1997 (1997-06-05) page 8, line 14 -page 19, line 13 page 1-3	11,12, 22,23
A	WO 95 15649 A (DISCOVERY COMMUNICAT INC ;HENDRICKS JOHN S (US)) 8 June 1995 (1995-06-08) cited in the application page 9, line 23 -page 23, line 14 page 29, line 32 -page 35, line 15 figures 1-18	1-82

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. ional Application No
PCT/US 00/24819

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		EP 0963116 A	08-12-1999
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